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## REPORT OF THE EIGHTH MEETING OF THE OIE WORKING GROUP ON ANIMAL WELFARE

Paris, 30 June–2 July 2009

The OIE Working Group on Animal Welfare (hereinafter referred to as the WG) held its eighth meeting at the OIE Headquarters in Paris on 30 June–2 July 2009.

The members of the WG and other participants are listed in [Appendix A](#). The Agenda adopted is given in [Appendix B](#). Dr D. Bayvel chaired the meeting.

Dr Alex Thiermann, President of the Terrestrial Animal Health Standards Commission of the OIE (hereinafter referred to as the Code Commission), welcomed the members of the WG, congratulated them on work undertaken to date and thanked them for agreeing to continue working on this important mandate of the OIE.

Dr Bayvel commented on the evolution of the role of the WG, in relation to the development and implementation of the OIE animal welfare strategy. Dr Thiermann supported Dr Bayvel's point of view and highlighted the transformation of the Group from a purely editorial, peer review body to a more strategic one. Because of this, there is a very important relationship between this Group and the Code Commission.

Dr Stuardo reported that the meeting with the Director General would take place on the second day of the WG meeting.

### 1. AWWG 7th Meeting Report, Action Minutes, Informal Meetings and Teleconferences

Members noted the report. Dr Bayvel referred to the action list that had been produced for review at teleconferences with the OIE Headquarters. It was decided to continue to hold teleconferences and to share the record with members of the WG. It was also agreed to develop a similar list of actions agreed at this annual meeting.

Dr Bayvel noted that the informal meetings of the WG seem to be an effective means of updating and involving the members between annual meetings and it was agreed to continue this modus operandi when opportunities arise.

Dr Wilkins proposed that other members of the WG consider participating in the routine teleconferences, with a focus on those that take place before Code Commission meetings. Dr Wilkins proposed that such a teleconference be arranged on a yearly basis in the month of January. The WG agreed with Dr Wilkins and the OIE Headquarters will propose a suitable date in January 2010.

## 2. OIE General Session 2009 outcomes

Dr Bayvel provided feedback to the WG on his presentation and the discussion that had taken place during the 77<sup>th</sup> General Session in May (77 GS).

### 2.1. Resolution on Animal Welfare

The Animal Welfare Resolution was adopted by consensus, with little discussion. The recommendations of the 2<sup>nd</sup> OIE Global Conference on Animal Welfare were of particular interest and the original wording adopted after minor amendments.

### 2.2. Guidelines on stray dog population control - Chapter 7.7.

Dr Bayvel confirmed that the new Chapter entitled “Guidelines on Stray Dog Population Control” was adopted unanimously. Noting that Members expressed some concerns at the General Session 2009, Dr Bayvel confirmed that the WG and the Code Commission, at its next meeting in September, will review these concerns.

Dr Rahman noted that one of the important problems in the implementation of these new guidelines is the different authorities involved in this issue. Because of this, he proposed to ask the Director General to write to the OIE Delegates, to ask them to make contact with the relevant authorities and to inform them of the existence of these new guidelines.

Dr Gavinelli commented on some concerns of the European Union, such as the definition of stray dog.

Dr Gregory proposed that the Annexe on carrying capacity should be expanded, as this is one of the more important aspects in establishing a stray dog population control strategy.

The adopted Guidelines are in the WG Report at [Appendix C](#).

### 2.3. Welfare during transport of farmed fish – Appendix 3.4.2.

Dr Stuardo informed the WG on the unanimous adoption at the 77<sup>th</sup> General Session in May 2009 of the Appendix on the Welfare of Farmed Fish during Transport.

The adopted Appendix is in the WG Report at [Appendix D](#).

### 2.4. OIE Animal Welfare Collaborating Centres (University of Massey extension - University of Valdivia (Chile) and Universidad de la República (Uruguay) new centres)

Dr Stuardo advised that at the 77<sup>th</sup> General Session, the World Assembly of Delegates accepted the proposal to establish an OIE Collaborating Centre for Animal Welfare Science and Bioethical Analysis, with participation of the following institutions: Animal Welfare Science and Bioethics Centre (AWSBC), Massey University, Palmerston North, New Zealand; Animal Behaviour and Welfare Research Centre, AgResearch Ruakura, Hamilton, New Zealand; The Animal Welfare Science Centre, University of Melbourne, Victoria, Australia; The Centre for Animal Welfare and Ethics, University of Queensland, St Lucia, Queensland, Australia; and The Commonwealth Scientific and Industrial Research Organisation (CSIRO), Division of Livestock Industries, St Lucia, Queensland, Australia. This Centre will incorporate and replace the current OIE Collaborating Centre for Animal Welfare Science and Bioethical Analysis (Asia/Pacific).

Dr Stuardo also confirmed that the application to establish an OIE Collaborating Centre for Animal Welfare Research, based at the Faculty of Veterinary Science, Universidad Austral de Chile, Valdivia, Chile, in collaboration with the Animal Welfare Group at the Faculty of Veterinary Medicine, Universidad de República, Montevideo, Uruguay was also adopted.

## **2.5. Application of the Universidad Nacional Autónoma de México Animal Welfare centre (México)**

Dr Stuardo informed the WG that an application from the Universidad Nacional Autónoma de México Animal Welfare centre (México) had been received and he also advised that the Director General had sent an interim reply explaining that, consistent with OIE procedures, the proposal would be presented to the WG, to relevant specialized Commissions, to the Regional Commission of the Americas and to the OIE Council during 2009.

Dr Thiermann suggested that new applications for Animal Welfare Collaborating Centres should reflect the regional demand for research and that applicant institutions should work in close coordination with the OIE Regional Representations.

Dr Molomo noted the importance of support to less developed countries for research and development in the animal welfare field in these countries.

Dr Fraser proposed that for new applications to become Collaborating Centres in the animal welfare field, careful consideration should be given to both geographical location and whether or not the applicant possesses internationally recognised experience and expertise in an important animal welfare area.

## **2.6. World Animal Health and Welfare Fund (World Fund)**

Dr Wilkins asked for clarification regarding the OIE World Fund. It was confirmed that money given by the EU for animal welfare had either been spent or was earmarked for expenditure. There was no other money in the fund for animal welfare use. This was confirmed by Dr Thiermann.

## **2.7. Other issues**

Dr Bayvel advised that a Technical Mission comprising staff of the OIE, WSPA and Istituto Zooprofilattico Sperimentale dell'Abruzzo e del Molise "G.Caporale", will be visiting Cairo on 4-5 July to address animal welfare issues arising from the recent cull of the urban pig population. The mission is an outcome of meetings held on 26 and 28 May 2009 with the OIE Delegate for Egypt.

Dr Bayvel advised about a meeting held during the 77<sup>th</sup> OIE General Session with a research team lead by Dr Pierre Le Niendre, to discuss the request of the French Government to Institut de National de Recherche Agronomique (INRA) to conduct a major review on animal pain. A report of this expert consultation is expected for the beginning of November 2009. The results will be compiled in a report with an English summary. INRA will organise a final colloquium to present the results to all interested parties.

Dr Bayvel advised that a meeting was also held with the OIE Publications Department to discuss ongoing projects on animal welfare.

Dr Wilkins recalled the important debate on the Technical Item at the General Session which was dedicated to the impact of climate change. He asked to be kept informed if an ad hoc group was to be set up to look further into this issue and suggested that an animal welfare representative could be one of the members of the ad hoc group.

## **3. Work of the Aquatic Animal Health Standards Commissions**

### **3.1. Update on aquatic animal welfare standards. Report of the March 2009 meeting of the Aquatic Animal Health Standards Commission**

Dr Stuardo advised that during the report of the 77<sup>th</sup> General Session, Dr Hill President of the Aquatic Animal Health Commission (hereinafter referred to as the Aquatic Animals Commission) stated that the Commission will consider the development of additional chapters on slaughter and on killing for disease control purposes.

Dr Wilkins expressed his concerns, after the retirement of Dr Håstein from the Group, about how the WG would continue to have effective communication with the Aquatic Animals Commission.

### 3.2. Next steps in the development of a text on aquatic animal welfare

The WG asked for the opportunity to review the proposals of the Aquatic Commission before proposing them for adoption by the World Assembly of Delegates.

## 4. Report of the *ad hoc* Group on Private Standards and International Trade in Animals and Animal Products

Dr Bayvel referred to the outcomes of the brainstorming meeting on private standards held at the OIE Headquarters on 17 of March 2009. He also referred to the first meeting of the *ad hoc* Group 4-5 June 2009. Dr Bayvel confirmed that one of the important outcomes of that meeting was the decision to send an OIE questionnaire to Members and other important stakeholders.

Dr Wilkins reaffirmed the position of ICFAW that, in the absence of international standards, private standards are one of the best ways to promote animal welfare in farm animals. Dr Wilkins expressed his satisfaction with the discussions to date but stated that he would like to see more active participation of those Industry Groups representing the retail food industry.

Mr Mirabito stated that the meeting of the *ad hoc* Group on private standards was positive and emphasised the point of view of the International Dairy Federation (IDF), which supports the OIE's work on animal welfare standards with the objective of improving animal welfare worldwide. Mr Mirabito advised that the IDF is also in favour of communication and consultation involving all stakeholders. He emphasised that extensive communications activities are needed, especially to provide consumers with a better understanding of industrial farming practices.

Dr Gavinelli expressed an interest in discussing the questionnaire, in particular the language used in the questions. Dr Gavinelli also expressed his concern about the lack of representation of the retail sector, which could be important to ensure a balanced debate.

Dr Fraser expressed concerns about the process of the development of a questionnaire and the benefits of input from a social scientist to ensure responses are not biased.

Dr Olsen commented that he did not see the difference between animal welfare and health, in the private standard context.

Dr Molomo noted that OIE standards benefit all countries and there should not be any conflict between Private Standards and OIE Standards.

### Next steps

The AWWG reviewed the questionnaire and will send its comments informally to the OIE Headquarters before the 10<sup>th</sup> July 2009.

## 5. Report of the *ad hoc* Group on Laboratory Animal Welfare

### Second draft Guidelines

Dr Bayvel provided feedback from the last meeting of the *ad hoc* Group in December 2008. Dr Bayvel informed the AWWG that a new version of the Draft Annex was presented for comment to the Code Commission meeting in March 2009. He also advised that the Director General is very interested in the future development of this important issue and has asked the *ad hoc* Group to meet again in August 2009. At the August meeting the comments received to date from the EU, ICFAW and OIE members will be considered.

Dr Bayvel confirmed that other areas of priority being addressed by the *ad hoc* group included:

- Transport by air
- Veterinary training
- Animal use for regulatory purposes .

## **6. Report of the Electronic Consultation on the welfare of Poultry**

### **6.1. Proposal for modification of existing OIE Animal Welfare Chapters**

Dr Wilkins and Dr Stuardo informed members about the final Report of the Electronic Consultation on Poultry Welfare. The WG reviewed the document and made some changes to the text prepared by the *ad hoc* Group.

The WG thanked the Members of the *ad hoc* Group for their extensive review of all the existing OIE animal welfare standards from a poultry welfare perspective.

### **6.2. Next steps**

The WG agreed to present the revised document, with these modifications, to the Code Commission at its September meeting.

The adopted Appendix is in the WG Report at [Appendix E](#).

## **7. Cairo Conference Recommendations**

Dr Bayvel updated WG members regarding the discussion on the conference recommendations, which had been noted by the World Assembly of OIE Delegates in May 2009.

## **8. Other business**

### **8.1. Ethical concerns relevant to the work of the OIE on international animal welfare guidelines/standards - Long-distance transport (including export) of animals for slaughter (Report by Dr Wilkins to the Animal Welfare Working Group)**

By way of an example, Dr Bayvel referred to the evolution of New Zealand policy in this area and the significance of the Customs Export Prohibition Order 2007 and current consultation on Animal Welfare Export Certificate Guidelines. The approach adopted in New Zealand is based on assessment of animal welfare risk rather than a policy of prohibition per se. Dr Bayvel suggested that greater emphasis on the risk posed to animal health, in addition to animal welfare, could be included in the draft paper prepared by Dr Wilkins.

Dr Gregory commented that in developing countries where there is limited access to refrigeration it is necessary to take live animals to city markets to supply urban communities with meat. In some situations this involves moving the animals on foot or by vehicle over long distances. This trade is inevitable, and it would be inappropriate to deny access to meat in those communities on animal welfare grounds. He also noted that in some developing countries there are animals that are surplus to national need and these are exported to provide income. An important example that involves a large number of animals is the export of cattle and water buffalo from India. India has the largest population of cattle and water buffalo in the world, yet it slaughters relatively few of these animals. Large numbers are exported to Bangladesh, which has insufficient home-produced protein. Bangladesh needs to import the animals live because of inadequate refrigerated transport of meat and to have confidence that the animals have been slaughtered using halal methods that are locally accepted. Long distance transport is inevitable under these circumstances.

It was agreed that Dr Wilkins would revise the draft paper to reflect the comments and feedback provided by other WG members.

### **8.2. Wildlife harvesting and culling – Issues and options paper. Report prepared by David Wilkins (WSPA), for the Animal Welfare Working Group**

Dr Wilkins summarised the background to his report, which gives a detailed description of the methods used for culling seals and whales. In each section he had listed the options that he felt were being offered to the OIE but had refrained from making recommendations as this was the responsibility of the WG.

After discussion the WG agreed to recommend that the OIE should not attempt to draw up standards for the killing of seals or the killing of whales, mainly due to the lack of robust scientific information on which standards could be based. Dr Wilkins felt that the OIE may be wise not to enter this controversial arena.

Dr Wilkins also referred to a preliminary draft report that he had prepared on the killing of vertebrate pest species, particularly non indigenous species. Copies of this draft report had been sent to the OIE the day before the Working Group meeting.

The WG decided that a paper should be developed to give the OIE guidance on how it should approach the topic of humane killing of wildlife and related issues in the future. Dr David Fraser agreed to prepare a draft in association with Dr. Molomo, Dr Bayvel and Dr. Wilkins.

### **8.3. An evaluation of an electrical stun/killing device for crustaceans intended to be eaten (Report of Dr Wilkins to the Animal Welfare Working Group)**

Dr Wilkins commented on the Report on a commercially available device to stun crustaceans. The WG noted Dr Wilkins report and recommended that it be forwarded to the Aquatic Animals Commission for its information.

### **8.4. Future work on Animal Welfare and Livestock production systems *ad hoc* Groups (Broilers – Beef)**

Dr Stuardo advised that the Members of the *ad hoc* Group on Broilers met at the OIE Headquarters on 15–17 June and developed a first draft text, which was presented to the WG for information. Dr Stuardo also advised that the Beef Cattle production systems *ad hoc* group had been established and would meet on 27–29 July 2009.

The Report of the first meeting of the OIE *ad hoc* Groups on broiler chicken production systems will be presented for information to the Code Commission and appears in the WG Report as [Appendix F](#).

### **8.5. Animal Welfare Regional Strategies (Regional Animal Welfare Strategy Implementation Plan - Asia, the Far-East and Oceania)**

Dr Bayvel confirmed that the implementation plan is currently being considered by the Regional Commission, with a view to formal approval at the Shanghai OIE Regional Commission in November 2009. The Regional Representation is also planning to hold a Regional Animal Welfare Conference, probably in Bangkok.

### **8.6. OIE Animal Welfare Regional Seminars and other Regional Strategies reports**

It was noted that a European Regional Commission conference will be held in Istanbul in July and the WG confirmed its interest in receiving annual updates on regional activities pertinent to animal welfare.

### **8.7. Global Trade and Farm Animal Welfare Conference January 2009 Brussels**

Dr Gavinelli provided feedback on the outcomes of this conference, including the increasing recognition of animal welfare as a concern in food production around the world as well as the need to raise animal welfare standards to an acceptable level, including in developing countries.

Dr Gavinelli also noted that other important topics discussed at the meeting included consideration of animal welfare in the World Trade Organization (WTO) arena; synergies and cooperation with existing multilateral fora (such as OIE and FAO), in particular for the implementation of the OIE standards; the importance of animal-based measures in establishing and implementing standards and good practices on animal welfare; communication and information as key activities in promoting globally animal welfare and cooperation between global stakeholders to improve animal welfare.

Dr Gavinelli advised that a follow up meeting would probably take place during the Welfare Quality Stakeholder Conference in Uppsala, in October.

### **8.8. September 2008 FAO expert meeting – Capacity building to implement good animal welfare practice**

Dr Fraser provided information on the FAO Expert Meeting on ‘Capacity Building to Implement Good Animal Welfare Practices’, which took place on 30 September- 3 October 2008. Expert Meetings are a normal part of FAO practice and are used to guide the organization on how to proceed in areas where new activity is anticipated. Ten experts were drawn from ten countries. The OIE was one of several organizations invited to send an observer. The full report of the meeting is available at: <ftp://ftp.fao.org/docrep/fao/011/i0483e/i0483e00.pdf>

In summary, the meeting recommended to the FAO that:

- to support good animal welfare practices in countries with less developed economies, the FAO should give priority to practices that lead to benefits for both people and animals,
- animal welfare should be treated as one among many socially important goals,
- animal welfare should be integrated into existing FAO programmes,
- FAO staff should attempt to understand and engage with the people who work with animals, and facilitate their own innovation and problem-solving,
- improving the welfare of animals should begin with an assessment of the risks and opportunities and a search for practical improvements,
- FAO should facilitate access by Member Countries to the findings of animal welfare research,
- FAO should consider working with other organizations to provide assistance on animal welfare legislation,
- the FAO work in full cooperation with the OIE and other organizations with capabilities that complement its own.

### **8.9. Animal Welfare Portal: FAO and partners**

Dr Bayvel referred to the release of the FAO web portal, which is an access point for a wide range of information related to the welfare of farm animals. Dr Stuardo confirmed that the OIE has joined this initiative and is part of the Editorial Board along other international organisations.

#### **8.10. Biotechnology and welfare considerations**

Dr Wilkins stated that he felt that it was important that the WG discussed this issue following a report that had been debated in the 2008 General Session. However, he felt that members would benefit from some background information including an indication of the main arguments in this debate. It was agreed that Dr Wilkins would provide a paper to accompany the report from the 2008 General Session for discussion at the WG's next meeting.

#### **8.11. Summary communication document**

Dr Rahman presented to the WG a summary document providing an update on the Animal Welfare activities at the OIE for general communication purposes and possible inclusion in the OIE Bulletin. Dr Stuardo indicated that the OIE is currently reviewing the animal welfare fact sheet, and it was agreed that WG Members would send comments on Dr Rahman's draft to Dr Stuardo.

#### **8.12. Collaborating Centre annual reports (Teramo and Massey)**

Dr Bayvel confirmed that, according to normal procedures, OIE Collaborating Centres had presented an annual report on their activities. These reports were presented for information to the WG.

#### **8.13. FAWC Working Group update**

Dr Wilkins indicated that the WG could receive a final document for discussion prior to the next meeting.

#### **8.14. Animal Welfare Working Group Membership**

Taking into account the outcomes of the October 2008 FAO Expert Panel on Animal Welfare, the FAO strategic commitment to assist internationally with animal welfare capacity building and the success of the recently FAO Animal Welfare Portal, the Working Group considered that very definite benefits could arise from direct involvement of the FAO as a WG member. It was agreed that a paper will be drafted summarizing the evolution and development of the WG membership, to date, and detailing the potential benefits of FAO membership.

#### **8.15. OIE International Conference on Wildlife Diseases and Trade, March 2011 (tentatively)**

Dr Stuardo informed the WG about a planned OIE Conference on Wildlife diseases to be held in March 2011. OIE Headquarters will inform the WG on the development of the Conference Programme.

#### **8.16. Welfare Quality Project**

Dr Gavinelli informed the WG about the final stages of the Welfare Quality Project, including a final stakeholder Conference planned for October 2009. Dr Stuardo informed that the OIE was invited to this Conference and the OIE participation was confirmed.

#### **8.17. Global programme of capacity building of OIE Delegates and OIE Focal Points**

Dr Stuardo updated the WG on this OIE project and advised that, at the present time, the Regional Activities Department was finalising the schedule of activities for the next two years. It was agreed that Dr Stuardo would communicate with the WG on the dates for training activities on animal welfare.

### **8.18. OIE Conference: Evolving veterinary education for a safer world**

Dr Stuardo advised that this conference will be held in Paris on 12–14 October and that Drs Rahman and Bayvel were invited speakers.

### **8.19. Universal Declaration on Animal Welfare (UDAW)**

Dr Wilkins provided an update on the UDAW, including a meeting held at the United Nation Headquarters in New York, which an OIE representative attended. The main goal of the meeting was to initiate the process of drafting a United Nations text to introduce the animal welfare issue on the UN Sustainability Agenda.

Dr Rahman confirmed that the Indian Government is participating actively in this initiative.

Dr Fraser indicated that WSPA should consider the Report of the FAO expert meeting where there are some specific references to animal welfare and the Millennium Goals.

### **8.20. Prof. Donald Broom retirement**

It was agreed to write a letter on behalf of the WG to Prof. Broom, who is retiring later in the year, to recognise the very significant contribution that Prof. Broom has made to animal welfare science internationally.

### **8.21. Situation with the killing of dogs in China**

Dr Wilkins stated that several reports from the Shaanxi province in China had indicated that the authorities had embarked on a large scale destruction of dogs using inhumane methods. This programme followed an outbreak of rabies. WSPA and other international AW NGOs had written to the authorities and referred them to the OIE documents on “Killing for disease control” and the “Stray dog control guidelines”. Emphasis had also been made on the vital importance of mass vaccination programmes as the best method of controlling rabies.

## **9. Work programme for 2009/2010**

The contents of the 2009/2010 work programme were discussed and it was agreed that Dr Bayvel and OIE Headquarters would circulate a draft work programme prior to the end of the year.

## **10. Next Meeting**

It was agreed that the next meeting of the Working Group would be held on 23-25 June 2010 back to back with the 2<sup>nd</sup> International Conference of OIE Reference Laboratories and Collaborating Centres.

## **11. Meeting with the Director General**

Dr Bayvel advised Dr Vallat of the WG discussion on several important issues, including the development of the Fifth OIE Strategic Plan.

Dr Vallat confirmed that the OIE welcomes input on the strategic plan from Members and new Members of the elected Commissions. One of the important issues in the new Strategic Plan is the relationship between the environment and animal production, with a focus on animal health. Dr Vallat emphasised that in discussing the control of wildlife, including feral species, it is important to consider both animal health and animal welfare in choosing control methods.

Dr Vallat referred to the OIE/FAO Global Conference on Foot and Mouth Disease, which was recently held in Paraguay. At this Conference, important findings were presented on the relationship between wildlife and disease dissemination. Dr Vallat also referred to the Global OIE Initiative on Training Delegates and Focal Points as a mechanism to support the implementation of the OIE animal welfare standards. Dr Vallat asked the WG to comment on the training programme for animal welfare focal points.

Dr Vallat updated the WG on the latest developments on the issue of private standards, emphasising that the mandate given by OIE Members on this topic was based among other aspects on the problems that some developing countries are having to foresee with such standards. Dr Vallat also asked the WG to comment on the questionnaire prepared by the *ad hoc* Group on Private Standards.

Dr Vallat asked the WG for advice on the OIE policy for approval of new animal welfare collaborating centres. He stated that, to date, the OIE had used two fundamental criteria, i.e. geographical balance and scientific excellence.

Dr Bayvel asked Dr Vallat for further information on the Second International Conference of OIE Reference Laboratories and Collaborating Centres, which is due to be held in Paris on 21–23 June 2010. Dr Vallat noted that this presented a good opportunity for a side event for the Animal Welfare Collaborating Centres.

Dr Wilkins referred to the proposed new standards on farmed fish (i.e. slaughter and killing for disease control) and expressed his concern about the future working arrangements between the WG and the Aquatic Animals Commission. Dr Vallat agreed to ask this Commission to include this point in the agenda of the Aquatic Animals Commission meeting in September.

Dr Rahman raised concerns about the future implementation of the new Guidelines on Stray Dog Population Control. Dr Vallat agreed with Dr Rahman and, as in some countries the Veterinary Services are not the competent authority for stray dogs, he agreed to write a letter to the OIE Delegate to encourage him to contact the relevant competent authority for the control of dog population to inform them about the new OIE standards.

Dr Fraser updated Dr Vallat on the proposal to develop a strategic approach to determine the new challenges that WG should tackle in the future. He advised that the WG was discussing possible criteria to determine the relative priority of proposed future standards. He confirmed that the WG will deliver a draft policy for discussion at the next meeting in 2010.

Dr Vallat informed the WG on the OIE Initiative on Veterinary Legislation, which establishes the minimum requirements of veterinary legislation and asked members to comment on this work. Concerning the criteria to establish priorities for future standards, Dr Vallat asked the WG to finalise the ongoing work and give priority to standards linked with animal disease and zoonosis policies.

Dr Wilkins updated Dr Vallat on the proposal to address the culling of seals, noting that scientific information in this area is currently insufficient to facilitate the development of animal welfare standards. Dr Vallat agreed that the WG should concentrate its efforts on the control of feral animals that present animal disease, zoonoses and biodiversity risks. However, Dr Vallat has no objection to the WG, if it wished, continuing to discuss the issue of seal culling.

Dr Gavinelli commented on the importance of input by the OIE Regional Commissions to raise awareness of animal welfare issues and noted the need for greater participation by the scientific community, with the involvement of animal welfare researchers, to allow a more informed debate. Dr Vallat recalled the five Region structure of the OIE and the participation of the Regional Representations. He also confirmed that the regional animal welfare strategies are an important tool for raising awareness and supporting the implementation of animal welfare standards by OIE Members.

Dr Molomo thanked Dr Vallat on the initiatives conducted by the OIE in Africa but noted that process to date has been slow and proposed use of ongoing activities such the African Veterinary Association Congress and the proposed 5TH Pan Commonwealth Veterinary Conference in Accra, Ghana in 2011 to raise awareness on this issue. Dr Vallat agreed with these suggestions and assured OIE's cooperation and also proposed to include animal welfare in the programme of the African Veterinary Congress to be held in Cameroon in September 2009

Dr Molomo thanked Dr Vallat on the initiatives conducted by the OIE in Africa but noted that process to date has been slow and proposed use of ongoing activities such the African Veterinary Association Congress to raise awareness on this issue. Dr Vallat agreed with this suggestion and also proposed to include animal welfare in the programme of the African Veterinary Congress to be held in Cameroon in September 2009.

Dr Bayvel raised the OIE twinning procedure as a useful tool to assist developing countries to develop expertise in the animal welfare area.

Dr Vallat concluded his remarks and referred to the situation with the culling of pigs in Egypt due to concerns about influenza AH1N1. He commented that an OIE mission would visit Cairo to discuss future training activities in the area of killing animals for disease control purposes, to avoid similar situations in the future. Dr Wilkins indicated that it would be important for the Egyptian Government to have a strong commitment to support and follow up this training.

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.../Appendices



**8<sup>th</sup> MEETING OF THE OIE WORKING GROUP ON ANIMAL WELFARE****Paris, 30 June–2 July 2009****List of participants****MEMBERS OF THE OIE WORKING GROUP**

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**8<sup>th</sup> MEETING OF THE OIE WORKING GROUP ON ANIMAL WELFARE****Paris, 30 June–2 July 2009**

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**Provisional agenda**

Introduction and priorities / Dr D Bayvel

Introduction of participants / Dr D Bayvel

Administrative arrangements / Dr L Stuardo

Adoption of the agenda

- 1. AWWG 7<sup>th</sup> Meeting Report, Action Minutes, Informal Meetings and Teleconferences**
- 2. OIE General Session 2009 outcomes**
  - Resolution on Animal Welfare
  - Guidelines on stray dog population control - Chapter 7.7.
  - Welfare during transport of farmed fish – Appendix 3.4.2.
  - OIE Animal Welfare Collaborating Centres (University of Massey extension. And University of Valdivia (Chile)-Universidad de la República (Uruguay) new centres)
  - Application of the Universidad Nacional Autónoma de México Animal Welfare centre (México)
  - World Animal Health and Welfare Fund
  - other issues raised
- 3. Work of the Aquatic Animal Health Standards Commissions**
  - Update on aquatic animal welfare standards. Report of the March 2009 meeting of the Aquatic Animal Health Standards Commission
  - Next steps in the development of a text on aquatic animal welfare
- 4. Report of the *ad hoc* Group on Private Standards and International Trade in Animals and Animal Products**
- 5. Report of the *ad hoc* Group on Laboratory Animal Welfare**
  - Second draft Guidelines
  - Other priorities
  - Next steps
- 6. Report of the Electronic Consultation *ad hoc* Group on Animal Welfare in Poultry**
  - Proposal of modification for OIE Animal Welfare existing Chapters
  - Next steps

Appendix B (contd)**7. Cairo Conference Recommendations****8. Other business**

- Ethical concerns relevant to the work of the OIE on international animal welfare guidelines/standards - Long-distance transport (including export) of animals for slaughter (Report of Dr Wilkins to the Animal Welfare Working Group)
- Wildlife harvesting and culling – Issues and options paper. Report prepared by David Wilkins (WSPA), Member of the WG
- An evaluation of an electrical stun/killing device for Crustaceans intended to be eaten (Report of Dr Wilkins to the Animal Welfare Working Group)
- Future work on Animal Welfare and Livestock production systems *ad hoc* Groups (Broilers – Beef)
- Animal Welfare Regional Strategies (Regional Animal Welfare Strategy Implementation Plan - Asia, the Far-East and Oceania)
- OIE Animal Welfare Regional Seminars and other Regional Strategies reports
- January 2009 Brussels Conference - Global Trade and Farm Animal Welfare Conference
- September 2008 FAO expert meeting – Capacity building to implement good animal welfare practice
- Animal Welfare Portal: FAO and partners
- Biotechnology and welfare considerations
- Summary communication document
- Collaborating Centres annual reports (Teramo and Massey)
- FAWC Working Group update
- Animal Welfare Working Group Membership
- OIE International Conference on Wildlife Diseases and Trade March 2011

**9. Work programme 2009****10. Next Meeting**

## CHAPTER 7.7.

## GUIDELINES ON STRAY DOG POPULATION CONTROL

**Preamble:** The scope of these recommendations is to deal with stray and feral dogs, which pose serious human health, animal health and welfare problems and have a socio-economic, political—and religious problems in many countries. Whilst acknowledging human health is a priority including the prevention of zoonotic diseases notably rabies, the OIE recognises the importance of controlling dog populations without causing unnecessary or avoidable animal suffering. Veterinary Services should play a lead role in preventing zoonotic diseases and ensuring animal welfare and should be involved in dog population control, coordinating their activities with other competent public institutions and/or agencies.

Article 7.7.1.

### Guiding principles

The following recommendations are based on those laid down in Chapter 7.1. Some additional principles are relevant to these recommendations:

1. The promotion of Responsible dog ownership can significantly reduce the numbers of stray dogs and the incidence of zoonotic diseases.
2. Because dog ecology is linked with human activities, control of dog populations has to be accompanied by changes in human behaviour to be effective.

Article 7.7.2.

### Definitions

#### **Stray dog**

means any dog not under direct control by a person or not prevented from roaming.

Types of stray dog:

- a) free-roaming owned dog not under direct control or restriction at a particular time;
- b) free-roaming dog with no owner;
- c) feral dog: domestic dog that has reverted to the wild state and is no longer directly dependent upon humans for successful reproduction.

#### **Owned dog**

means a dog with a person that claims responsibility.

#### **Person**

this can include more than one individual, and could comprise family/household members or an organisation.

#### **Responsible dog ownership**

means the situation whereby a person (as defined above) accepts and commits to perform various duties according to the legislation in place and focused on the satisfaction of the behavioural, environmental and physical needs of a dog and to the prevention of *risks* (aggression, *disease* transmission or injuries) that the dog may pose to the community, other animals or the environment.

Annex C (contd)**Euthanasia**

means the act of inducing death in a humane manner.

**Dog population control programme**

means a programme with the aim of reducing a stray dog population to a particular level and/or maintaining it at that level and/or managing it in order to meet a predetermined objective (see Article 7.7.3).

**Carrying capacity**

means the upper limit of the dog population density that could be supported by the habitat based on the availability of resources (food, water, shelter), and human acceptance.

Article 7.7.3.

**Dog population control programme objectives**

The objectives of a programme to control the dog population may include the following:

1. improve health and welfare of owned and stray dog population;
2. reduce numbers of stray dogs to an acceptable level;
3. promote responsible ownership;
4. assist in the creation and maintenance of a rabies immune or rabies-free dog population;
5. reduce the risk of zoonotic diseases other than rabies;
6. manage other risks to human health (e.g. parasites);
7. prevent harm to the environment and other animals;
8. prevent illegal trade and trafficking.

Article 7.7.4.

**Responsibilities and competencies**1. *Veterinary Authority*

The *Veterinary Authority* is responsible for the implementation of animal health and animal welfare legislation, in coordination with other competent government agencies and institutions. Control of endemic zoonotic diseases such as rabies and parasitic infections (e.g. *Echinococcus* spp.) would require technical advice from the *Veterinary Authority*, as animal health and some aspects of public health are within this Authority's competence but organising and/or supervising dog control schemes can be the responsibility of non-governmental organisations and governmental agencies other than the *Veterinary Authority*.

2. Other government agencies

The responsibilities of other government agencies will depend on the risk being managed and the objective/nature of the dog population control measures employed.

The ministry or other agency responsible for public health would normally play a leadership role and may have legislative authority in dealing with zoonotic diseases. Control of stray dogs with regard to other human health risks (e.g. stray dogs on roads; dog attacks within communities) may fall within the responsibility of the public health agency but is more likely to be the responsibility of the local government authorities or other agencies for public safety/security operating at the state/provincial or municipal level.

Environment protection agencies may take responsibility for control problems associated with stray dogs when they present a hazard to the environment (e.g. control of feral dogs in national parks; prevention of dog attacks on wildlife or transmission of *diseases* to wildlife) or where a lack of environmental controls is giving rise to stray dog populations that threaten human health or access to amenities. For example, environmental protection agencies may regulate and enforce measures to prevent dogs from accessing waste or human sewage.

### 3. Private sector veterinarians

The private sector veterinarian is responsible for providing advice to dog owners or handlers consulting the veterinarian for advice or treatment of a dog. The private sector veterinarian can play an important role in *disease* surveillance because he/she might be the first to see a dog suffering from a *notifiable disease* such as rabies. It is necessary that the private sector veterinarian follow the procedure established by the *Veterinary Authority* for responding to and reporting a suspected rabies case or a dog that is suffering from any other *notifiable disease*. Private sector veterinarians also play an important role (often in liaison with the police and/or local authorities) in dealing with cases of neglect that can lead to problems with stray and mismanaged dogs.

The private veterinarian has competence and will normally be involved in dog health programmes and population control measures, including health testing, vaccination, identification, kennelling during the absence of the owner, sterilisation and euthanasia. Two-way communication between the private sector veterinarian and *Veterinary Authority*, often via the medium of a veterinary professional organisation, is very important and the *Veterinary Authority* is responsible for setting up appropriate mechanisms for this action.

### 4. Non governmental organisations (NGOs)

Non governmental organisations (NGOs) are potentially important partners of the *Veterinary Services* in contributing to public awareness and understanding and helping to obtain resources to contribute in a practical way to the design and successful implementation of dog control programmes. NGOs can supply local knowledge on dog populations and features of ownership, as well as expertise in handling and kennelling dogs and the implementation of sterilisation programmes. NGOs can also contribute, together with veterinarians and the authorities in educating the public in responsible dog ownership.

### 5. Local government authorities

Local government authorities are responsible for many services and programmes that relate to health, safety and public good within their jurisdiction. In many countries the legislative framework gives authority to local government agencies in regard to aspects of public health, environmental health/hygiene and inspection/compliance activities.

Annex C (contd)

In many countries local government agencies are responsible for the development and enforcement of legislation relating to dog ownership (e.g. registration, microchipping, vaccination, leash laws, abandonment), the control of stray dogs (e.g. dog catching and shelters) and the alleviation of the problems stray dogs cause in their jurisdiction. This would normally be done with advice from a higher level (national or state/provincial) authority with specialised expertise in regard to public health and animal health. Collaboration with the private sector veterinarians (e.g. in programs to sterilise and vaccinate stray dogs) and NGOs is a common feature of dog control programmes. Regardless of the legislative basis, it is essential to have the co-operation of local government authorities in the control of stray dogs.

6. Dog owners

When a person takes on the ownership of a dog there should be an immediate acceptance of responsibility for that dog, and for any offspring it may produce, for the duration of its life or until a subsequent owner is found. The owner must ensure that the welfare of the dog, including behavioural needs, are respected and the dog is protected, as far as possible, from infectious *diseases* (e.g. through vaccination and parasite control) and from unwanted reproduction (e.g. through contraception or sterilisation). Owners should ensure that the dog's ownership is clearly identified (preferably with permanent identification such as a tattoo or microchip) and, where required by legislation, registered on a centralised database. All reasonable steps should be taken to ensure that the dog does not roam out of control in a manner that would pose a problem to the community and/or the environment.

## Article 7.7.5.

In the development of a dog population control programme it is recommended that the authorities establish an advisory group, which should include veterinarians, experts in dog ecology, dog behaviour and zoonotic diseases, and representatives of relevant stakeholders (local authorities, human health services/authorities, environmental control services/authorities, NGOs and the public). The main purpose of this advisory group would be to analyse and quantify the problem, identify the causes, obtain public opinion on dogs and propose the most effective approaches to use in the short and long term.

Important considerations are as follows:

1. Identifying the sources of stray dogs

- a) Owned dogs that roam freely
- b) Dogs that have been abandoned by their owner, including puppies resulting from uncontrolled breeding of owned dogs.
- c) Unowned dogs that reproduce successfully.

2. Estimating the existing number, distribution and ecology

Practical tools that are available include registers of dogs, population estimates, and surveys of dogs, owners, dog shelters and veterinarians. The important factors relevant to the dog carrying capacity of the environment include food, shelter, water and human attitudes and behaviour.

A methodology could be established to make an estimate of the total dog population. An overview of appropriate methodologies may be found in Article 7.7.8. The same methodology could be used at appropriate intervals to assess population trends.

### 3. Regulatory framework

A regulatory framework that would help authorities establish successful dog control programmes could include the following key elements:

- a) registration and identification of dogs and licensing of dog breeders;
- b) vaccination against rabies and other preventive measures against zoonotic disease, as appropriate;
- c) veterinary procedures (e.g. surgical procedures);
- d) control of dog movement (national and international);
- e) control of dangerous dogs;
- f) regulations on the breeding and sale of dogs;
- g) environmental controls (e.g. *abattoirs*, rubbish dumps, dead stock facilities);
- h) regulations for dog shelters;
- i) animal welfare obligations of owners and authorities.

### 4. Resources available to authorities

- a) Human resources;
- b) financial resources;
- c) technical tools;
- d) infrastructure;
- e) cooperative activities;
- f) public-private-NGO partnerships;
- g) central-state or province-local partnerships.

Article 7.7.6.

### **Control measures**

The following control measures could be implemented according to the national context and local circumstances. Measures may be used in combination. Euthanasia of dogs, used alone, is not an effective control measure. If used, it should be done humanely (see point 11 of Article 7.7.6.) and in combination with other measures to achieve effective long term control. It is also important that authorities gain an understanding of people's attitudes towards dog ownership so that they can develop a cooperative approach to the control of dog populations.

Annex C (contd)1. Education and legislation for responsible ownership

Encouraging dog owners to be more responsible will reduce the number of dogs allowed to roam, improve the health and welfare of dogs, and minimise the risk that dogs pose to the community. The promotion of responsible dog ownership through legislation and education is a necessary part of a dog population control programme. Collaboration with local government authorities, animal welfare NGOs, kennel clubs, private veterinarians and veterinary organisations will assist *Veterinary Authorities* in establishing and maintaining programmes.

Education on responsible dog ownership (for the currently owned dog and any offspring it produces) should address the following elements:

- a) the importance of proper selection and care to ensure the welfare of the dog and any offspring; the latter may include preparing the dog to cope with its environment through attention to socialisation and training;
- b) registration and identification of dogs (see point 2 of Article 7.7.6.);
- c) disease prevention, in particular zoonotic disease, e.g. through regular vaccination in rabies endemic areas;
- d) preventing negative impacts of dogs on the community, via pollution (e.g. faeces and noise), risks to human health through biting or traffic accidents and risks to other dogs, wildlife, livestock and other companion animal species;
- e) control of dog reproduction.

In order to achieve a shift towards responsible ownership, a combination of legislation, public awareness, education, and promotion of these elements will be required. It may also be necessary to improve access to resources supporting responsible ownership, such as veterinary care, identification and registration services and measures for control of zoonotic diseases.

2. Registration and identification of dogs (licensing)

A core component of dog population control by the *Competent Authorities* is the registration and identification of owned dogs. This may include granting licences to owners and breeders. Registration and identification may be emphasized as part of responsible dog ownership and are often linked to animal health programs, for example, mandatory rabies vaccination and traceability.

Registration of animals in a centralised database can be used to support the enforcement of legislation and the reuniting of lost animals with owners. The control of dog reproduction by sterilisation can be encouraged through financial incentives presented by differential licensing fees.

3. Reproductive control

Controlling reproduction in dogs prevents the birth of unwanted puppies and can help address the balance between demand for dogs and the size of the population. It is advisable to focus efforts to control reproduction on those individuals or groups in the dog population identified as the most productive and the most likely to be the sources of unwanted and stray dogs, to ensure best use of resources. Methods of controlling reproduction will require direct veterinary input to individual animals. Involvement of both private and public veterinary sectors may be required to meet demand for services. Subsidisation of sterilisation programmes by government or other organisations may be considered to encourage uptake. The control of reproduction is essentially the responsibility of owners and can be incorporated into education on responsible ownership (see point 1 of Article 7.7.6.). Methods for controlling reproduction in dogs include:

- a) surgical sterilisation;
- b) chemical sterilisation;
- c) chemical contraception;
- d) separation of female dogs during oestrus from unsterilised males.

Surgical sterilisation should be carried out by a veterinarian and include appropriate anaesthesia and pain management.

Any chemicals or drugs used in controlling reproduction should be shown to have appropriate safety, quality and efficacy for the function required and used according to the manufacturer's and *Competent Authority's* regulations. In the case of chemical sterilants and contraceptives, research and field trials may need to be completed before use.

#### 4. Removal and handling

The *Competent Authority* should collect dogs that are not under direct supervision and verify their ownership. Capture, transport, and holding of the dogs should be done humanely. The *Competent Authority* should develop and implement appropriate legislation and training to regulate these activities. Capture should be achieved with the minimum force required and equipment should be used that supports humane handling. Uncovered wire loops should not be used for capture.

#### 5. Capture and return, rehoming or release

*Competent Authorities* have the responsibility to develop minimum standards for the housing (physical facilities) and care of these dogs. There should be provision for holding the dogs for a reasonable period of time to allow for reunion with the owner and, as appropriate, for rabies observation.

- a) Minimum standards for housing should include the following provisions:
  - i) site selection: Access to drainage, water and electricity are essential and environmental factors such as noise and pollution should be taken into account;
  - ii) kennel size, design and occupancy taking exercise into account;
  - iii) *disease* control measures including isolation and quarantine facilities.
- b) Management should address:
  - i) adequate fresh water and nutritious food;
  - ii) regular hygiene and cleaning;
  - iii) routine inspection of the dogs;
  - iv) monitoring of health and provision of required veterinary treatments;
  - v) policies and procedures for rehoming (adoption), sterilisation and euthanasia;
  - vi) training of staff in safe and appropriate handling of dogs;
  - vii) record keeping and reporting to authorities.

Annex C (contd)

Dogs that are removed from a community may be reunited with the owner or offered to new owners for rehoming. This provides an opportunity to promote responsible ownership and good animal health care (including rabies vaccination). Prior to rehoming, authorities may consider sterilisation of dogs as a population control measure. The suitability of new owners to adopt dogs should be assessed and owners matched with available animals. The effectiveness of rehoming may be limited due to the suitability and number of dogs.

Dogs that are removed from a community may in some cases be provided with health care (including rabies vaccination), sterilised, and released to their local community at or near the place of capture. This method is more likely to be accepted in the situation where the presence of stray dogs is considered to be inevitable and is well tolerated by the local community.

This method is not applicable in all situations and may be illegal in countries or regions where legislation prohibits the abandonment of dogs. Problems caused by dogs, such as noise, faecal pollution, bite injuries and traffic accidents, would not be alleviated as dogs are returned to the local community and their movements are not restricted. If the local community has owned dogs, and sterilised dogs are released, consideration should be given to the risk that this could encourage abandonment of unwanted dogs. In the situation where many dogs are owned, a population control programme that focuses on neutering and responsible ownership may be more appropriate.

It is recommended that before adopting this approach, a cost-benefit analysis is conducted. Factors such as the monetary costs, impact on culture of ownership and public safety should be assessed as well as the benefits for *disease* control and animal welfare as well as any societal benefits.

- c) If this method is adopted, the following factors should be addressed:
- i) raising awareness of the programme within the local community to ensure understanding and support;
  - ii) use of humane methods for catching, transporting and holding dogs;
  - iii) correct surgical technique, anaesthesia and analgesia, followed by post-operative care;
  - iv) *disease* control may include blanket vaccination (e.g. rabies) and treatments and testing for *diseases* (e.g. leishmaniasis) followed, as appropriate by treatment or euthanasia of the dog;
  - v) behavioural observation may be used to assess if dogs are suitable for release; if not suitable for release or rehoming, euthanasia should be considered;
  - vi) permanent marking (e.g. tattoo or microchip) to indicate that the animal has been sterilised. Individual identification also allows for tracking of vaccination status and treatment history and identification of a level of 'ownership' by the organisation/authority responsible for carrying out this intervention. A visible identification (e.g. collar) may also be used to prevent unnecessary recapture;
  - vii) the dog should be returned to a place that is as near as possible to the place of capture;
  - viii) the welfare of dogs after release should be monitored and action taken if required.

Dogs that are removed from a community may be too numerous or may be unsuitable for any rehoming scheme. If euthanasia of these unwanted animals is the only option, the procedure should be conducted in accordance with the regulations of the *Competent Authority* (see point 11 of Article 7.7.6.)

6. Environmental controls

Steps should be taken to exclude dogs from sources of food (e.g. rubbish dumps and *abattoirs*, and installing animal-proof rubbish containers).

This should be linked to a reduction in the dog population by other methods, to avoid animal welfare problems.

7. Control of dog movement – international (export/import)

Chapter 8.10. provides recommendations on the international movement of dogs between rabies free countries and countries considered to be infected with rabies.

8. Control of dog movements – within country (e.g. leash laws, roaming restrictions)

Measures for the control of dog movement in a country are generally invoked for the following reasons:

- a) for rabies control when the *disease* is present in a country;
- b) for public safety reasons;
- c) for the safety of “owned dogs” in an area or locality when a stray dog control programme is in place;
- d) to protect wildlife and livestock.

It is necessary to have a regulatory framework and a national or local infrastructure comprising organisation, administration, staff and resources to encourage the finders of stray dogs to report to the *Competent Authority*.

9. Regulation of commercial dog dealers

Dog breeders and dealers should be encouraged to form or join an appropriate association. Such associations should encourage a commitment to the raising and selling of physically and psychologically healthy dogs, as unhealthy dogs may be more likely to be abandoned to become part of the stray population. They should encourage breeders and dealers to provide advice on proper care to all new owners of dogs. Regulations covering commercial dog breeders and dealers should include specific requirements for accommodation, provision of suitable food, drink and bedding, adequate exercise, veterinary care and disease control and may require breeders and dealers to allow regular inspection, including veterinary inspection.

10. Reduction in dog bite incidence

The most effective means of reducing prevalence of dog bites are education and placing responsibility on the owner. Dog owners should be educated in principles of responsible dog ownership as described in point 1 of Article 7.7.6. Legal mechanisms that enable the *Competent Authorities* to impose penalties or otherwise deal with irresponsible owners are necessary. Mandatory registration and identification schemes will facilitate the effective application of such mechanisms. Young children are the group at highest risk for dog bites. Public education programmes focussed on appropriate dog-directed behaviour have been demonstrated to be effective in reducing dog bite prevalence and these programmes should be encouraged. Authorities should seek advice from dog behaviour experts in developing dog safety education programmes.

Annex C (contd)11. Euthanasia

When euthanasia is practised, the general principles in the *Code* should be followed, with the emphasis on using the most practical, rapid and humane methods and ensuring operator safety. Regardless of the method used, it is important to minimise distress, anxiety and pain by ensuring that operators are appropriately trained.

Table 1 shows a list of methods for the euthanasia of dogs.

**Table 1: List of methods for the euthanasia of dogs**

<b>Euthanasia method</b>	<b>Specific method</b>	<b>Animal welfare concerns/ implications</b>	<b>Key animal welfare requirements</b>	<b>Considerations relating to operator security</b>	<b>Advantages</b>	<b>Disadvantages</b>
<b>Chemical -via injection</b>	Barbiturates	Correct restraint is needed.  IP is slow and may be irritant.  IC injection is a painful procedure.	Recommend to use IV injection.  When using IP injection, the solution may be diluted or local anaesthetic agent used in conjunction.  IC should only be performed on unconscious animal and by skilled operator.	Correct restraint is needed.  Administered under veterinary supervision and requires trained personnel.	Speed of action generally depends on the dose, concentration, route and rate of injection.  Barbiturates induce euthanasia smoothly, with minimal discomfort to the animal.  Barbiturates are less expensive than many other euthanasia agents.	These drugs persist in the carcass and may cause sedation or death in animals that consume the cadaver.
	Embutramide +Mebezonium +Tetracaine	Muscle paralysis may occur before lost of consciousness if injection given rapidly	Use slow IV injection with sedation to permit slow rate of injection.	Correct restraint is needed.  To be administered under veterinary supervision and by trained personnel.	Quite low cost.	Unavailable/unlicensed in some countries
<b>Chemical -via injection (contd)</b>	Anaesthetic agent overdose (thiopentone or propofenol)	Underdosing may lead to recovery	IV injection of a sufficient dose	Correct restraint is needed.  To be administered under veterinary supervision and by trained personnel.	Generally quick action and minimal discomfort to animal.	Large volume required (cost implications)
	Potassium chloride (KCl)	K <sup>+</sup> is cardiotoxic and very painful if used without anaesthetic agent.	Only use on anaesthetised animals, IV injection	Requires trained personnel.	Readily available without veterinary control.	Prior need for anaesthetic (cost and availability implications)

Annex C (contd)**Table 1: List of methods for the euthanasia of dogs (contd)**

<b>Mechanical</b>	Free bullet	Can be inhumane if shot is inaccurate and dog is only wounded; dog may also escape.	Skilled operator essential.	Risk of injury to operators and spectators.	Not necessary to handle or capture dog.	Brain tissue may be unavailable for rabies diagnosis. Risk of injury to bystanders. Legal constraints on use of firearms.
	Penetrating captive bolt followed by pithing where necessary to ensure death	Can be inhumane if shot is inaccurate and dog is only wounded.	Skilled operator essential.	Animal must be restrained. Skilled operator essential.	No risk to operator (cf free bullet) unless risk of dog infected with rabies, due to potential contact with brain tissue	Brain tissue may be unavailable for rabies diagnosis. Legal constraints on use of firearms. May raise aesthetic objections.
	Exsanguination	Onset of hypovolaemia may cause dog to become anxious.	Only use on unconscious animal	Danger to operator through use of sharp instrument.	Material requirements minimal.	Must be done on unconscious animal. Aesthetically objectionable

**Table 1: List of methods for the euthanasia of dogs (contd)**

<b>Euthanasia method</b>	<b>Specific method</b>	<b>Animal welfare concerns/ implications</b>	<b>Key animal welfare requirements</b>	<b>Considerations relating to operator security</b>	<b>Advantages</b>	<b>Disadvantages</b>
<b>Gaseous</b>	Carbon monoxide (CO)	Inadequate concentration of CO is not lethal and can cause suffering. Signs of distress (convulsions, vocalization and agitation) may occur.	Compressed CO in cylinders must be used to achieve and maintain adequate concentration, which must be monitored. Note: fumes from gasoline engines are an irritant and this source of CO is not recommended.	Very hazardous for operator - gas is odourless and causes toxicity at both acute high levels and chronic low levels	Dog dies quite rapidly if concentration of 4 to 6% used.  No odour (therefore no aversive effect). Gas is not flammable or explosive except at concentration greater than 10%.	

Annex C (contd)**Table 1: List of methods for the euthanasia of dogs (contd)**

<b>Euthanasia method</b>	<b>Specific method</b>	<b>Animal welfare concerns/ implications</b>	<b>Key animal welfare requirements</b>	<b>Considerations relating to operator security</b>	<b>Advantages</b>	<b>Disadvantages</b>
<b>Gaseous</b>	Carbon dioxide (CO <sub>2</sub> )	Gas is aversive. Inadequate concentration of CO <sub>2</sub> is not lethal and can cause suffering. CO <sub>2</sub> is heavier than air, so when incomplete filling of the chamber occurs, dogs may raise their head and avoid exposure. Few studies on adequate concentration and animal welfare.	Compressed CO <sub>2</sub> gas chamber is the only acceptable method because the concentration can be monitored and regulated.	Minimal hazard to operator when properly designed equipment used.	Gas is not flammable or explosive and causes quite rapid anaesthesia when correct concentrations used.  Low cost.  Readily available as compressed gas	Unconsciousness can occur in minutes, but death may take some time. Likelihood of suffering before unconsciousness.
	Inert gas (nitrogen, N <sub>2</sub> argon, Ar)	Loss of consciousness is preceded by hypoxemia and ventilatory stimulation, which may be distressing to the dog.  Re-establishing a low concentration of O <sub>2</sub> (i.e. greater than or equal to 6%) in the chamber before death will allow immediate recovery.	Concentration above 98% must be achieved rapidly and maintained. Properly designed equipment must be used	Minimal hazard to operator when properly designed equipment used.	Gas is not flammable or explosive and is odourless.  Readily available as compressed gas.	High cost.  Little data on animal welfare implications in dogs.

**Table 1: List of methods for the euthanasia of dogs (contd)**

<b>Euthanasia method</b>	<b>Specific method</b>	<b>Animal welfare concerns/ implications</b>	<b>Key animal welfare requirements</b>	<b>Considerations relating to operator security</b>	<b>Advantages</b>	<b>Disadvantages</b>
<b>Gaseous</b>	Anaesthetic gas overdose (halothane or enflurane)	Animal may struggle and become anxious during induction. Vapours may be irritating and can induce excitement.	Supplementation with air or O <sub>2</sub> required to avoid hypoxemia during induction phase.	Some gases may be hazardous, especially for pregnant women. General recommendation: Avoid human exposure to greater than or equal to 2ppm to avoid narcosis.	Gas is not flammable or explosive. Valuable for use with small animals (<7kgs) and animals that are already anaesthetised with gas.	High cost.  Anaesthetic and euthanasia properties of the gas used must be known.  Isoflurane has a pungent odour. Methoxyflurane's action is slow and dog may become agitated.
<b>Electrical</b>	Electrocution	Cardiac fibrillation occurs before onset of unconsciousness, causing severe pain if dog is conscious. Pain can also be caused by violent extension of the limbs, head and neck.  Method may not be effective if insufficient current applied.	Dogs must be unconscious before being electrocuted. This can be accomplished by electrical stunning (current through the brain to produce an instantaneous stun) or anaesthesia. Electrodes should span the brain in order that the current passed through the brain in order to achieve an effective stun. Death would result from current passed through the heart of an unconscious animal.  Proper equipment and trained operator is essential.	May be hazardous for operator, who should use protective equipment (boots and gloves).	Low cost.	Inhumane if performed on conscious dog. May raise aesthetic objections.

KEY to abbreviations used in Table 1:

IV: intravenous

IP: Intraperitoneal

IC: Intracardiac

## Annex C (contd)

### a) Comments on methods for the euthanasia of dogs:

#### i) Restraint

When a dog needs to be restrained for any procedure, including euthanasia, this should always be done with full regard for operator security and animal welfare. Some euthanasia methods must be used in association with sedation or anaesthesia in order to be considered humane.

#### ii) Special equipment

When special equipment is needed to perform euthanasia (e.g. gas chamber) the system should be designed for the purpose and regularly maintained in order to achieve operator security and animal welfare.

#### iii) The following methods, procedures and practices are unacceptable on animal welfare grounds:

##### • Chemical methods:

- Embutramide +Mebezonium +Tetracaine without sedation or by other than IV injection
- Chloral hydrate
- Nitrous oxide: may be used with other inhalants to speed the onset of anaesthesia, but alone it does not induce anaesthesia in dogs
- Ether
- Chloroform
- Cyanide
- Strychnine
- Neuromuscular blocking agents (nicotine, magnesium sulphate, potassium chloride, all curariform agents) : when used alone, respiratory arrest occurs before loss of consciousness, so the dog may perceive pain
- Formalin
- Household products and solvents.

##### • Mechanical methods:

- Air embolism on conscious animal
- Burning
- Exsanguination of conscious animal
- Decompression: expansion of gas trapped in body cavities may be very painful
- Drowning
- Hypothermia, rapid freezing
- Stunning: stunning is not a euthanasia method, it should always be followed by a method which ensures death.
- Kill-trapping
- Electrocutation of conscious animal.

Because neonatal animals and adults with impaired breathing or low blood pressure are resistant to hypoxia, methods that depend upon achieving a hypoxic state (e.g. CO<sub>2</sub>, CO, N<sub>2</sub>, Ar) should not be used. These methods should not be used in animals aged less than 2 months, except to produce loss of consciousness and should be followed by another method to cause death. Concussion and cervical dislocation may be used in very small neonatal dogs and only in cases of emergency.

Operators must be well trained in the use of physical techniques to ensure that they are correctly and humanely carried out. The dog must be exsanguinated immediately after concussion or cervical dislocation.

iv) Confirmation of death

For all methods of euthanasia used, death must be confirmed before animals are disposed of or left unattended. If an animal is not dead, another method of euthanasia must be performed.

v) Carcass disposal

Carcasses should be disposed of in a manner that complies with legislation. Attention must be paid to the risk of residues occurring in the carcase. Incineration is generally the safest way of carcass disposal.

Article 7.7.7

### **Monitoring and evaluation of dog population control programmes**

Monitoring and evaluation allows for comparison of important indicators against the baselines measured during initial assessment (see Article 7.7.5.). The three main reasons for carrying out monitoring and evaluation are:

1. to help improve performance, by highlighting both problems and successful elements of interventions;
2. for accountability, to demonstrate that the programme is achieving its aims;
3. assuming methods are standardised, to compare the success of strategies used in different locations and situations.

Monitoring is a continuous process that aims to check the programme progress against targets and allows for regular adjustments. Evaluation is a periodic assessment, usually carried out at particular milestones to check the programme is having the desired and stated impact. These procedures involve the measurement of 'indicators' that are chosen because they reflect important components of the programme at different stages. Selection of suitable indicators requires clear planning of what the programme is aiming to achieve, the best selection of indicators will be one that reflects the interest of all relevant stakeholders. Standardised methodology will facilitate comparison of data from subsequent evaluations and performance between different projects. Indicators can be direct measurements of an area targeted to change (e.g. population of free roaming dogs on public property) or indirect measures that reflect change in a targeted area.

4. Elements that should generally be monitored and evaluated include:
  - a) dog population size, separated ~~by~~ into sub-populations according to ownership and restriction of movement (i.e. roaming unrestricted or restricted by an owner);
  - b) dog welfare, in the target population (e.g. body condition score, skin conditions and injuries or lameness) and as a result of the programme (if interventions involve direct handling of dogs, the welfare of the dogs as result of this handling should be monitored);
  - c) prevalence of zoonotic diseases, such as rabies, in both the animal and human population;

- d) responsible animal ownership, including measures of attitudes and understanding of responsible ownership and evidence that this is translating into responsible behaviour.
5. There are many sources of information for monitoring and evaluation purposes, including:
- a) feedback from the local community (e.g. through the use of structured questionnaires, focus groups or 'open format' consultation processes);
  - b) records and opinions obtained from relevant professionals (e.g. veterinarians, medical doctors, law enforcement agencies, educators);
  - c) animal based measurements (e.g. direct observation surveys of population size and welfare status).

The output of activities against budget should be carefully recorded in order to evaluate the effort (or cost) against the outcomes and impact (or benefit) that are reflected in the results of monitoring and evaluation.

Article 7.7.8.

### **An overview of appropriate methods for estimating the size of dog populations.**

Population estimates are necessary for making realistic plans for dog population management and zoonosis control, and for monitoring the success of such interventions. However, for designing effective management plans, data on population sizes alone are insufficient. Additional information is required, such as degrees of supervision of owned dogs, the origin of ownerless dogs, accessibility, etc.

The term "owned" may be restricted to a dog that is registered with licensing authorities, or it may be expanded to unregistered animals that are somewhat supervised and receive shelter and some form of care in individual households. Owned dogs may be well supervised and restrained at all times, or they may be left without control for various time periods and activities. Dogs without owners that claim responsibility may still be accepted or tolerated in the neighbourhood, and individuals may provide food and protection. Such animals are sometimes called "community owned dogs" or "neighbourhood dogs". For an observer it is frequently impossible to decide if a free roaming dog belongs to someone or not.

The choice of methods for assessing the size of a dog population depends on the ratio of owned versus ownerless dogs, which may not always be easy to judge. For populations with a large proportion of owned dogs it may be sufficient to consult dog registration records or to conduct household surveys. These surveys should establish the number of owned dogs and the dog to human ratio in the area. In addition, questions on dog reproduction and demographics, care provided, zoonosis prevention, dog bite incidence, etc. may be asked. Sample questionnaires can be found in the "Guidelines for Dog Population Management" (WHO/WSPA 1990). Standard polling principles must be applied.

If the proportion of ownerless dogs is high or difficult to assess, then one must resort to more experimental approaches. Methods borrowed from wildlife biology can be applied. These methods are described in WHO/WSPA's "Guidelines for Dog Population Management" (1990), and in more detail in numerous professional publications and handbooks, such as Bookhout (1994) and Sutherland (2006). Being generally diurnal and tolerant to human proximity, dogs lend themselves to direct observation and the application of mark-recapture techniques. Nevertheless, a number of caveats and limitations have to be taken into account. Firstly, the risk of zoonotic disease transmission is increased through close physical contact. Also, the methods are relatively labour intensive, they require some understanding of statistics and population biology, and most importantly, they are difficult to apply to very large areas. One must take into account that dog distribution is non-random, that their populations are not static, and that individual dogs are fairly mobile.

Counting of dogs visible in a defined area is the simplest approach to getting information on population size. One has to take into account that the visibility of dogs depends on the physical environment, but also on dog and human activity patterns. The visibility of animals changes with the time of the day and with seasons as a function of food availability, shelter (shade), disturbance, etc. Repeated standardized counting of dogs visible within defined geographical localities (e.g. wards) and specific times will provide indications of population trends. Direct counting is most reliable if it is applied to small and relatively confined dog populations, e.g. in villages, where it might be possible to recognize individual dogs based on their physical appearance.

Methods using mark-recapture procedures are often considered more reliable. However, they also produce trustworthy results only when a number of preconditions are met. Mortality, emigration and recruitment into the population must be minimal during the census period. One may be able to incorporate corrective factors into the calculations.

It is therefore important that the recommended census procedures are applied at times of low dispersal and that one selects study plots of shape and size that minimize the effect of dog movements in and out of the observation area. Census surveys should be completed within a few days to a maximum of two weeks in order to reduce demographic changes. In addition, all individuals in the population must have an equal chance of being counted. This is a highly improbable condition for dogs, whose visibility depends on ownership status and degrees of supervision. It is therefore recommended that the investigator determines what fraction of the total population he/she might cover with an observational method and how much this part overlaps with the owned dog segment that he/she assesses with household surveys.

There are essentially two ways to obtain a population estimate if it is possible, in a defined area and within a few days, to tag a large number of dogs with a visible mark, e.g. a distinctive collar or a paint smudge. The first method requires that the capture (marking) effort remains reasonably constant for the whole length of the study. By plotting the daily number of dogs marked against the accumulated total of marked dogs for each day one can extrapolate the value representing the total number of dogs in the area. More commonly used in wildlife studies are mark recapture methods (Peterson-Jackson, Lincoln indices). Dogs are marked (tagged) and released back into the population. The population is subsequently sampled by direct observation. The number of marked and unmarked dogs is recorded. One multiplies the number of dogs that were initially marked and released by the number of subsequently observed dogs divided by the number of dogs seen as marked during the re-observation to obtain a total population estimate. Examples for the two methods are given in WHO/WSPA's "Guidelines for Dog Population Management" (1990).

Since the dog populations of entire countries, states, provinces or even cities are much too large for complete assessment, it is necessary to apply the methods summarized above to sample areas. These should be selected (using common sense) so that results can be extrapolated to larger areas.

Bookhout TA (ed), 1994: *Research and Management Techniques for Wildlife and Habitats*, 5th ed. The Wildlife Society, Bethesda, Maryland, 740p.

Sutherland WJ (ed), 2006: *Ecological Census Techniques - A Handbook*, 2nd ed. Cambridge University Press, Cambridge, 448 p.

WHO/WSPA, 1990: *Guidelines for Dog Population Management*. WHO/ZOON/90.165. WHO, Geneva, 116 p.



## CHAPTER 7.2.

## WELFARE OF FARMED FISH DURING TRANSPORT

**Preamble:** Transport is stressful to fish. This Chapter provides information to minimise the effect of transport on the welfare of farmed fish (hereafter referred to as fish). It applies to their transport by air, by sea or on land within a country and between countries, and only considers the issues related to their welfare. Recommendations for measures to control the *aquatic animal health risks* related to the transport of fish are included in Chapter 5.4. on Recommendations for safe transport of *aquatic animals* and *aquatic animal products*.

Article 7.2.1.

**Responsibilities**

All personnel handling fish throughout the transportation process are responsible for ensuring that consideration is given to the potential impact on the welfare of the fish.

The roles of each of the various personnel are defined below:

1. The responsibilities of the *Competent Authority* for the exporting and importing jurisdiction include:
  - a) establishing minimum standards for fish welfare during transport, including examination before, during and after their transport, appropriate certification and record keeping;
  - b) ensuring awareness and training of personnel involved in transport;
  - c) ensuring implementation of the standards, including possible accreditation of transport companies.
2. Owners and managers of fish at the start and at the end of the journey are responsible for:
  - a) the general health of the fish and their fitness for transport at the start of the journey and to ensure the overall welfare of the fish during the transport regardless of whether these duties are subcontracted to other parties;
  - b) ensuring competent personnel supervise operations at their facilities for fish to be loaded and unloaded in a manner that causes minimum stress and injury;
  - c) having a *contingency plan* available to enable humane killing of the fish at the start and at the end of the journey, as well as during the journey, if required;
  - d) ensuring the fish have a suitable environment to enter at their destination that ensures their welfare is maintained.
3. Transport companies, in cooperation with the farm owner/manager, are responsible for planning the transport to ensure that the transport can be carried out according to fish health and welfare standards including:
  - a) using a well maintained *vehicle* that is appropriate to the species to be transported;
  - b) ensuring that competent staff are available for loading and unloading; and to ensure swift, humane killing of the fish, if required;
  - c) having *contingency plans* to address emergencies and minimise stress during transport;
  - d) selecting suitable equipment for loading and unloading of the *vehicle*.
4. The person in charge of supervising the transport is responsible for all documentation relevant to the transport, and practical implementation of recommendations for welfare of fish during transport.

Article 7.2.2.

**Competence**

All parties supervising transport activities, including loading and unloading, should have an appropriate knowledge and understanding to ensure that the welfare of the fish is maintained throughout the process. Competence may be gained through formal training and/or practical experience.

1. All persons handling live fish, or who are otherwise responsible for live fish during transport, should be competent according to their responsibilities listed in Article 7.2.1.
2. *Competent Authority*, farm owners/managers, and transport companies have a responsibility in providing training to their staff and personnel.
3. Any necessary training should address species-specific knowledge and may include practical experience on:
  - a) fish behaviour, physiology, general signs of *disease* and poor welfare;
  - b) operation and maintenance of equipment relevant to fish health and welfare;
  - c) water quality and suitable procedures for water exchange;
  - d) methods of live fish handling during transport, loading and unloading (species-specific aspects when relevant);
  - e) methods for inspection of the fish, management of situations frequently encountered during transport such as changes in water quality parameters, adverse weather conditions, and emergencies;
  - f) methods for the humane killing of fish in accordance with Chapter X.X. on the Humane killing of fish for disease control purposes (in preparation);
  - g) logbooks and record keeping.

Article 7.2.3.

**Planning the transport**

1. General considerations

Adequate planning is a key factor affecting the welfare of fish during transportation. The pre-transport preparation, the duration and route of a transport should be determined by the purpose of the transport e.g. biosecurity issues, transport of fish for stocking farms or resource enhancement, for slaughter/killing for disease control purposes. Before the transport starts, plans should be made in relation to:

- a) type of *vehicle* and transport equipment required;
- b) route – such as distance, expected weather and/or sea conditions;
- c) nature and duration of the transport;
- d) need for care of the fish during the transport;
- e) emergency response procedures related to fish welfare;
- f) assessment of the necessary biosecurity level (e.g. washing and *disinfection* practices, safe places for changing water, treatment of transport water (refer to Chapter 5.4)).

## 2. Vehicle design and maintenance

- a) *Vehicles* and *containers* used for transport of fish should be appropriate to the species, size, weight and number of fish to be transported.
- b) *Vehicles* and *containers* should be maintained in good mechanical and structural condition to prevent predictable and avoidable damage of the *vehicle* that may directly or indirectly affect the welfare of transported fish.
- c) *Vehicles* (if relevant) and *containers* should have adequate circulation of water and equipment for oxygenation as required to meet variations in the conditions during the journey and the needs of the animals being transported, including the closing of valves in well boats for biosecurity reasons.
- d) The fish should be accessible to inspection en route, if necessary, to ensure that fish welfare standards can be assessed.
- e) Documentation that focuses on fish welfare and thus carried with the *vehicle* should include a transport logbook of stocks received, contact information, mortalities and disposal/storage logs.

## 3. Water

- a) Water quality (e.g. oxygen, CO<sub>2</sub> and NH<sub>3</sub> level, pH, temperature, salinity) should be appropriate for the species being transported and method of transportation.
- b) Equipment to monitor and maintain water quality may be required depending on the length of the transport.

## 4. Preparation of fish for the transport

- a) Prior to transport, feed should be withheld from the fish, taking into consideration the fish species and life stage to be transported.
- b) The ability of the fish to cope with the stress of transport should be assessed based on health status, previous handling and recent transport history of the fish. [Except for disease control purposes. (under study)] Only fish that are fit for transport should be loaded.
- c) Reasons for considering of unfitness of fish for transport includes:
  - i) displaying clinical signs of *disease*,
  - ii) significant physical injuries or abnormal behaviour, such as rapid ventilation or abnormal swimming;
  - iii) recent exposure to stressors that adversely affect behaviour or physiological state (for example extreme temperatures, chemical agents).

## 5. Species-specific recommendations

Transport procedures should take account of variations in the behaviour and specific needs of the transported fish species. Handling procedures that are successful with one species may be ineffective or dangerous for another species.

Some species or life stages may need to be physiologically prepared prior to entering a new environment, such as by feed deprivation or osmotic acclimatisation.

## 6. Contingency plans

There should be a *contingency plan* that identifies the important adverse fish welfare events that may be encountered during the transport, the procedures for managing each event and the action to be taken in such an event. For each event, the plan should document the actions to be undertaken and the responsibilities of all parties involved, including communications and record keeping.

Article 7.2.4.

### **Documentation**

1. Fish should not be loaded until the required documentation is complete.
2. The documentation accompanying the consignment (the transport log) should include:
  - a) description of the consignment (e.g. date, time, and place of loading, species, biomass load);
  - b) description of the transport plan (e.g. including route, water exchanges, expected time, date and place of arrival and unloading and receiver contact information).
3. The transport log should be made available to the dispatcher and the receiver of the consignment as well as to the *Competent Authority* upon request. Transport logs from previous journeys should be kept after completion of the transport for a period of time as specified by the *Competent Authority*.

Article 7.2.5.

### **Loading the fish**

1. The issues which should be addressed to avoid unnecessary stress and injury to the fish include:
  - a) crowding procedure in farm pond, tank, net or cage prior to loading;
  - b) equipment (such as nets, pumps, pipes and fittings) both improperly constructed, for example with sharp bends or protrusions or improperly operated by overloading the system with fish of incorrect size or number of fish per time unit according to the equipments capacity;
  - c) water quality - some species of fish should be acclimatised if there is a likelihood of the fish being transported in water of a significantly different temperature or other water parameters.
2. The density of fish in a *vehicle* and/or *container* should be in accordance with scientific data where available and not exceed what is generally accepted for a given species and a given situation.
3. Loading should be carried out, or supervised, by operators with knowledge and experience of the behaviour and other characteristics of the fish species being loaded to ensure that the welfare of the fish is maintained.

Article 7.2.6.

### **Transporting the fish**

1. General considerations
  - a) Periodic inspections should take place during the transport to verify that acceptable welfare is being maintained.
  - b) Ensure that water quality is monitored and the necessary adjustments made to avoid extreme conditions.
  - c) Travel in a manner that minimises uncontrolled movements of the fish.

2. Sick or injured fish

- a) In the event of a fish health emergency during transport, the *vehicle* operator should initiate the procedure to implement the *contingency plan* (see point 6 of Article 7.2.3.).
- b) If the killing of fish is necessary during the transport, the person in charge should ensure that the killing is carried out humanely in accordance with Chapter X.X. on the Humane killing of fish for disease control purposes (in preparation), and in compliance with relevant legislation.

Article 7.2.7.

**Unloading the fish**

1. The principles of good fish handling during loading apply equally during unloading.
2. Fish should be unloaded as soon as possible after arrival at the destination, allowing sufficient time to ensure that the unloading procedure does not cause harm to the fish. Some species of fish should be acclimatised if there is a likelihood of the fish being unloaded into water of a significantly different quality (such as temperature, salinity, pH).
3. Moribund or seriously injured fish should be removed and humanely killed in accordance with Chapter X.X. on the Humane killing of fish for disease control purposes (in preparation).

Article 7.2.8.

**Post-transport activities**

1. The person in charge of receiving the fish should closely observe them during the post-transport period, and keep appropriate records.
2. Fish showing abnormal clinical signs should be humanely killed in accordance with Chapter X.X. on the Humane killing of fish for disease control purposes (in preparation) or isolated and examined by a *veterinarian* or other qualified personnel, who may recommend treatment.
3. Significant problems associated with transport should be evaluated to prevent recurrence of such problems.



## CHAPTER 7.3.

## TRANSPORT OF ANIMALS BY LAND

**Preamble:** These recommendations apply to the following live domesticated *animals*: cattle, buffaloes, camels, sheep, goats, pigs, *poultry* and equines. They will also be largely applicable to some other *animals* (e.g. deer, other camelids and ratites). Wild, feral and partly domesticated *animals* may need different conditions.

## Article 7.3.1.

The amount of time *animals* spend on a *journey* should be kept to the minimum.

## Article 7.3.2.

1. Animal behaviour

*Animal handlers* should be experienced and competent in handling and moving farm livestock and understand the behaviour patterns of *animals* and the underlying principles necessary to carry out their tasks.

The behaviour of individual *animals* or groups of *animals* will vary depending on their breed, sex, temperament and age and the way in which they have been reared and handled. Despite these differences, the following behaviour patterns, which are always present to some degree in domestic *animals*, should be taken into consideration in handling and moving the *animals*.

Most domestic livestock are kept in **herds groups** and follow a leader by instinct.

*Animals* which are likely to harm each other in a group situation should not be mixed.

The desire of some *animals* to control their personal space should be taken into account in designing *loading* and *unloading* facilities, transport *vessels* and *containers*.

Domestic *animals* will try to escape if any person approaches closer than a certain distance. This critical distance, which defines the flight zone, varies among species and individuals of the same species, and depends upon previous contact with humans. *Animals* reared in close proximity to humans (i.e. tame) have a smaller flight zone, whereas those kept in free range or extensive systems may have flight zones which may vary from one metre to many metres. *Animal handlers* should avoid sudden penetration of the flight zone which may cause a panic reaction which could lead to aggression or attempted escape and compromise the *welfare* of the *animals*.

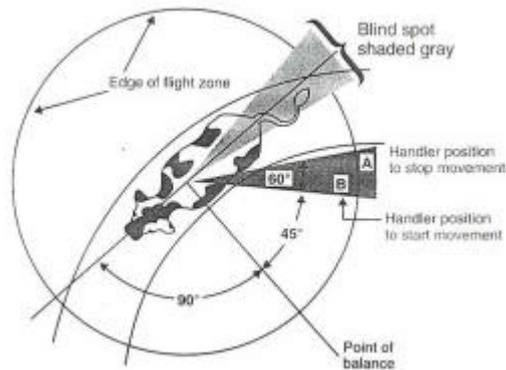
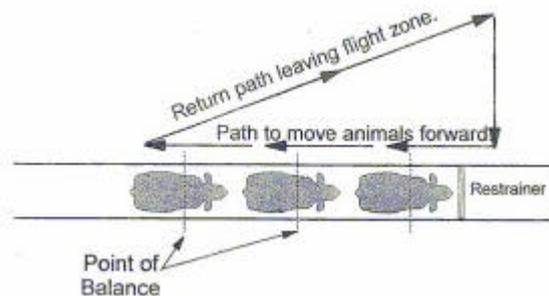
*Animal handlers* should use the point of balance at the *animal's* shoulder to move *animals*, adopting a position behind the point of balance to move an *animal* forward and in front of the point of balance to move it backward.

Domestic *animals* have a wide-angle vision but only have a limited forward binocular vision and poor perception of depth. This means that they can detect objects and movements beside and behind them, but can only judge distances directly ahead.

Although **all most** domestic *animals* have a highly sensitive sense of smell, they may react differently to the smells encountered during travel. Smells which cause negative responses should be taken into consideration when managing *animals*.

Annex E (contd)

Domestic *animals* can hear over a greater range of frequencies than humans and are more sensitive to higher frequencies. They tend to be alarmed by constant loud noises and by sudden noises, which may cause them to panic. Sensitivity to such noises should also be taken into account when handling *animals*.

**An example of a flight zone (cattle)****Handler movement pattern to move cattle forward****2. Distractions and their removal**

Design of new *loading* and *unloading* facilities or modification of existing facilities should aim to minimise the potential for distractions that may cause approaching *animals* to stop, baulk or turn back. Below are examples of common distractions and methods for eliminating them:

- a) reflections on shiny metal or wet floors - move a lamp or change lighting;
- b) dark entrances — illuminate with indirect lighting which does not shine directly into the eyes of approaching *animals*;
- c) *animals* seeing moving people or equipment up ahead — install solid sides on chutes and races or install shields;
- d) dead ends — avoid if possible by curving the passage, or make an illusory passage;

- e) chains or other loose objects hanging in chutes or on fences — remove them;
- f) uneven floors or a sudden drop in floor levels — avoid uneven floor surfaces or install a solid false floor to provide an illusion of a solid and continuous walking surface;
- g) sounds of air hissing from pneumatic equipment — install silencers or use hydraulic equipment or vent high pressure to the external environment using flexible hosing;
- h) clanging and banging of metal objects — install rubber stops on gates and other devices to reduce metal to metal contact;
- i) air currents from fans or air curtains blowing into the face of *animals* — redirect or reposition equipment.

Article 7.3.3.

### **Responsibilities**

Once the decision to transport the *animals* has been made, the *welfare* of the *animals* during their *journey* is the paramount consideration and is the joint responsibility of all people involved. The individual responsibilities of persons involved will be described in more detail in this Article.

The roles of each of those responsible are defined below:

1. The owners and managers of the *animals* are responsible for:
  - a) the general health, overall *welfare* and fitness of the *animals* for the *journey*;
  - b) ensuring compliance with any required veterinary or other certification;
  - c) the presence of an *animal handler* competent for the species being transported during the *journey* with the authority to take prompt action; in case of transport by individual trucks, the truck driver may be the sole *animal handler* during the *journey*;
  - d) the presence of an adequate number of *animal handlers* during *loading* and *unloading*;
  - e) ensuring that equipment and veterinary assistance are provided as appropriate for the species and the *journey*.
2. Business agents or buying/selling agents are responsible for:
  - a) selection of *animals* that are fit to travel;
  - b) availability of suitable facilities at the start and at the end of the *journey* for the assembly; *loading*, transport, *unloading* and holding of *animals*, including for any stops at *resting points* during the *journey* and for emergencies.
3. *Animal handlers* are responsible for the humane handling and care of the *animals*, especially during *loading* and *unloading*, and for maintaining a *journey log*. To carry out their responsibilities, they should have the authority to take prompt action. In the absence of a separate *animal handler*, the driver is the *animal handler*.
4. Transport companies, *vehicle* owners and drivers are responsible for planning the *journey* to ensure the care of the *animals*; in particular they are responsible for:

Annex E (contd)

- a) choosing appropriate *vehicles* for the species transported and the *journey*;
  - b) ensuring that properly trained staff are available for *loading/unloading of animals*;
  - c) ensuring adequate competency of the driver in matters of *animal welfare* for the species being transported in case a separate *animal handler* is not assigned to the truck;
  - d) developing and keeping up-to-date contingency plans to address emergencies (including adverse weather conditions) and minimise stress during transport;
  - e) producing a *journey* plan which includes a *loading* plan, *journey* duration, itinerary and location of resting places;
  - f) *loading* only those *animals* which are fit to travel, for their correct *loading* into the *vehicle* and their inspection during the *journey*, and for appropriate responses to problems arising; if its fitness to travel is in doubt, the *animal* should be examined by a *veterinarian* in accordance with point 3a) of Article 7.3.7.;
  - g) *welfare* of the *animals* during the actual transport.
5. Managers of facilities at the start and at the end of the *journey* and at *resting points* are responsible for:
- a) providing suitable premises for *loading, unloading* and securely holding the *animals*, with water and feed when required, and with protection from adverse weather conditions until further transport, sale or other use (including rearing or slaughter);
  - b) providing an adequate number of *animal handlers* to load, unload, drive and hold *animals* in a manner that causes minimum stress and injury; in the absence of a separate *animal handler*, the driver is the *animal handler*;
  - c) minimising the opportunities for disease transmission;
  - d) providing appropriate facilities, with water and feed when required;
  - e) providing appropriate facilities for emergencies;
  - f) providing facilities for washing and disinfecting *vehicles* after *unloading*;
  - g) providing facilities and competent staff to allow the humane *killing* of *animals* when required;
  - h) ensuring proper rest times and minimal delay during stops.
6. The responsibilities of *Competent Authorities* include:
- a) establishing minimum standards for *animal welfare*, including requirements for inspection of *animals* before, during and after their travel, defining 'fitness to travel' and appropriate certification and record keeping;
  - b) setting standards for facilities, *containers* and *vehicles* for the transport of *animals*;
  - c) setting standards for the competence of *animal handlers*, drivers and managers of facilities in relevant issues in *animal welfare*;
  - d) ensuring appropriate awareness and training of *animal handlers*, drivers and managers of facilities in relevant issues in *animal welfare*;

- e) implementation of the standards, including through accreditation of / interaction with other organisations;
  - f) monitoring and evaluating the effectiveness of standards of health and other aspects of *welfare*;
  - g) monitoring and evaluating the use of veterinary medications;
  - h) giving animal consignments priority at frontiers in order to allow them to pass without unnecessary delay.
7. All individuals, including *veterinarians*, involved in transporting *animals* and the associated handling procedures should receive appropriate training and be competent to meet their responsibilities.
8. The receiving *Competent Authority* should report back to the sending *Competent Authority* on significant *animal welfare* problems which occurred during the *journey*.

#### Article 7.3.4.

### Competence

1. All people responsible for *animals* during *journeys*, should be competent according to their responsibilities listed in Article 7.3.3. Competence may be gained through formal training and/or practical experience.
2. The assessment of the competence of *animal handlers* should at a minimum address knowledge, and ability to apply that knowledge, in the following areas:
  - a) planning a *journey*, including appropriate *space allowance*, and feed, water and ventilation requirements;
  - b) responsibilities for *animals* during the *journey*, including *loading* and *unloading*;
  - c) sources of advice and assistance;
  - d) animal behaviour, general signs of *disease*, and indicators of poor *animal welfare* such as stress, pain and fatigue, and their alleviation;
  - e) assessment of fitness to travel; if fitness to travel is in doubt, the *animal* should be examined by a *veterinarian*;
  - f) relevant authorities and applicable transport regulations, and associated documentation requirements;
  - g) general disease prevention procedures, including cleaning and *disinfection*;
  - h) appropriate methods of animal handling during transport and associated activities such as assembling, *loading* and *unloading*;
  - i) methods of inspecting *animals*, managing situations frequently encountered during transport such as adverse weather conditions, and dealing with emergencies, including humane *killing*;
  - j) species-specific aspects and age-specific aspects of animal handling and care, including feeding, watering and inspection; and
  - k) maintaining a *journey* log and other records.

**Planning the journey**1. General considerations

- a) Adequate planning is a key factor affecting the *welfare* of *animals* during a *journey*.
- b) Before the *journey* starts, plans should be made in relation to:
  - i) preparation of *animals* for the *journey*,
  - ii) choice of road, rail, roll-on roll-off vessels or *containers*,
  - iii) nature and duration of the *journey*,
  - iv) *vehicle* design and maintenance, including roll-on roll-off vessels;
  - v) required documentation;
  - vi) *space allowance*,
  - vii) rest, water and feed;
  - viii) observation of *animals* en route;
  - ix) control of *disease*,
  - x) emergency response procedures;
  - xi) forecast weather conditions (e.g. conditions being too hot or too cold to travel during certain periods of the day);
  - xii) transfer time when changing mode of transport, and
  - xiii) waiting time at frontiers and inspection points.
- c) Regulations concerning drivers (for example, maximum driving periods) should take into account *animal welfare* whenever possible.

2. Preparation of animals for the journey

- a) When *animals* are to be provided with a novel diet or method of water provision during transport, an adequate period of adaptation should be planned. For all *animals* it is essential that the rest stops during long journeys are long enough to fulfil each *animal's* need for feed and water. Species-specific short period of feed deprivation prior to *loading* may be desirable
- b) *Animals* more accustomed to contact with humans and with being handled are likely to be less fearful of being loaded and transported. *Animal handlers* should handle and load *animals* in a manner that reduces their fearfulness and improves their approachability.
- c) Behaviour-modifying compounds (such as tranquillisers) or other medication should not be used routinely during transport. Such compounds should only be administered when a problem exists in an individual *animal*, and should be administered by a *veterinarian* or other person who has been instructed in their use by a *veterinarian*.

### 3. Nature and duration of the journey

The maximum duration of a *journey* should be determined according to factors such as:

- a) the ability of the *animals* to cope with the stress of transport (such as very young, old, lactating or pregnant *animals*);
- b) the previous transport experience of the *animals*;
- c) the likely onset of fatigue;
- d) the need for special attention;
- e) the need for feed and water;
- f) the increased susceptibility to injury and *disease*;
- g) *space allowance*, *vehicle* design, road conditions and driving quality;
- h) weather conditions;
- i) *vehicle* type used, terrain to be traversed, road surfaces and quality, skill and experience of the driver.

### 4. Vehicle and container design and maintenance

- a) *Vehicles* and *containers* used for the transport of *animals* should be designed, constructed and fitted as appropriate for the species, size and weight of the *animals* to be transported. Special attention should be paid to avoid injury to *animals* through the use of secure smooth fittings free from sharp protrusions. The avoidance of injury to drivers and *animal handlers* while carrying out their responsibilities should be emphasised.
- b) *Vehicles* and *containers* should be designed with the structures necessary to provide protection from adverse weather conditions and to minimise the opportunity for *animals* to escape.
- c) In order to minimise the likelihood of the spread of infectious *disease* during transport, *vehicles* and *containers* should be designed to permit thorough cleaning and *disinfection*, and the containment of faeces and urine during a *journey*.
- d) *Vehicles* and *containers* should be maintained in good mechanical and structural condition.
- e) *Vehicles* and *containers* should have adequate ventilation to meet variations in climate and the thermo-regulatory needs of the animal species being transported; the ventilation system (natural or mechanical) should be effective when the *vehicle* is stationary, and the airflow should be adjustable.
- f) *Vehicles* should be designed so that the faeces or urine from *animals* on upper levels do not soil *animals* on lower levels, nor their feed and water. This condition is not applicable for *poultry*. They are generally transported in plastic cages which are designed to let air flow through in all directions to obtain a better ventilation.
- g) When *vehicles* are carried on board ferries, facilities for adequately securing them should be available.
- h) If feeding or watering while the *vehicle* is moving is required, adequate facilities on the *vehicle* should be available.

Annex E (contd)

- i) When appropriate, suitable bedding should be added to *vehicle* floors to assist absorption of urine and faeces, to minimise slipping by *animals*, and protect *animals* (especially young *animals*) from hard flooring surfaces and adverse weather conditions.
5. Special provisions for transport in vehicles (road and rail) on roll-on/roll-off vessels or for containers
- a) *Vehicles* and *containers* should be equipped with a sufficient number of adequately designed, positioned and maintained securing points enabling them to be securely fastened to the *vessel*.
  - b) *Vehicles* and *containers* should be secured to the *vessel* before the start of the sea *journey* to prevent them being displaced by the motion of the *vessel*.
  - c) Roll-on/roll-off *vessels* should have adequate ventilation to meet variations in climate and the thermo-regulatory needs of the animal species being transported, especially where the *animals* are transported in a secondary *vehicle/ container* on enclosed decks.
6. Space allowance
- a) The number of *animals* which should be transported on a *vehicle* or in a *container* and their allocation to compartments should be determined before *loading*.
  - b) The space required on a *vehicle* or in a *container* depends upon whether or not the *animals* need to lie down (for example, pigs, camels and *poultry*), or to stand (horses). *Animals* which will need to lie down often stand when first loaded or when the *vehicle* is driven with too much lateral movement or sudden braking.
  - c) When *animals* lie down, they should all be able to adopt a normal lying posture, without being on top of one another, and allowing necessary thermoregulation.
  - d) When *animals* are standing, they should have sufficient space to adopt a balanced position as appropriate to the climate and species transported.
  - e) The amount of headroom necessary depends on the species of *animal*. Each *animal* should be able to assume its natural standing position for transport (including during *loading* and *unloading*) without coming into contact with the roof or upper deck of the *vehicle*, and there should be sufficient headroom to allow adequate airflow over the *animals*. These conditions will not normally apply to *poultry*. However under tropical and subtropical conditions, *poultry* benefit from having adequate head room to allow head cooling.
  - f) Calculations for the *space allowance* for each *animal* should be carried out using the figures given in a relevant national or international document. The number and size of pens on the *vehicle* should be varied to where possible accommodate already established groups of *animals* while avoiding group sizes which are too large.
  - g) Other factors which may influence *space allowance* include:
    - i) *vehicle/ container* design;
    - ii) length of *journey*;
    - iii) need to provide feed and water on the *vehicle*;

- iv) quality of roads;
- v) expected weather conditions;
- vi) category and sex of the *animals*.

7. Rest, water and feed

- a) Suitable water and feed should be available as appropriate and needed for the species, age, and condition of the *animals*, as well as the duration of the *journey*, climatic conditions, etc.
- b) *Animals* should be allowed to rest at *resting points* at appropriate intervals during the *journey*. The type of transport, the age and species of the *animals* being transported, and climatic conditions should determine the frequency of rest stops and whether the *animals* should be unloaded. Water and feed should be available during rest stops.

8. Ability to observe animals during the journey

- a) *Animals* should be positioned to enable each *animal* to be observed regularly during the *journey* to ensure their safety and good *welfare*.
- b) If the *animals* are in crates or on multi-tiered *vehicles* which do not allow free access for observation, for example where the roof of the tier is too low, *animals* cannot be inspected adequately, and serious injury or *disease* could go undetected. In these circumstances, a shorter *journey* duration should be allowed, and the maximum duration will vary according to the rate at which problems arise in the species and under the conditions of transport.

9. Control of disease

As animal transport is often a significant factor in the spread of infectious *diseases*, *journey* planning should take the following into account:

- a) mixing of *animals* from different sources in a single consignment should be minimised;
- b) contact at *resting points* between *animals* from different sources should be avoided;
- c) when possible, *animals* should be vaccinated against *diseases* to which they are likely to be exposed at their destination;
- d) medications used prophylactically or therapeutically should be approved by the *Veterinary Authority* of the *exporting country* and the *importing country* and should only be administered by a *veterinarian* or other person who has been instructed in their use by a *veterinarian*.

10. Emergency response procedures

There should be an emergency management plan that identifies the important adverse events that may be encountered during the *journey*, the procedures for managing each event and the action to be taken in an emergency. For each important event, the plan should document the actions to be undertaken and the responsibilities of all parties involved, including communications and record keeping.

Annex E (contd)11. Other considerations

- a) Extreme weather conditions are hazardous for *animals* undergoing transport and require appropriate *vehicle* design to minimise risks. Special precautions should be taken for *animals* that have not been acclimatised or which are unsuited to either hot or cold conditions. In some extreme conditions of heat or cold, *animals* should not be transported at all.
- b) In some circumstances, transportation during the night may reduce thermal stress or the adverse effects of other external stimuli.

Article 7.3.6.

**Documentation**

1. *Animals* should not be loaded until the documentation required to that point is complete.
2. The documentation accompanying the consignment should include:
  - a) *journey* travel plan and emergency management plan;
  - b) date, time and place of *loading* and *unloading*;
  - c) veterinary certification, when required;
  - d) *animal welfare* competencies of the driver (under study);
  - e) *animal identification* to allow *animal traceability* to the premises of departure and, where possible, to the premises of origin;
  - f) details of any *animals* considered at particular risk of suffering poor *welfare* during transport (point 3e) of Article 7.3.7.);
  - g) documentation of the period of rest, and access to feed and water, prior to the *journey*;
  - h) *stocking density* estimate for each load in the consignment;
  - i) the *journey* log - daily record of inspection and important events, including records of morbidity and mortality and actions taken, climatic conditions, rest stops, travel time and distance, feed and water offered and estimates of consumption, medication provided, and mechanical defects.
3. When veterinary certification is required to accompany consignments of *animals*, it should address:
  - a) fitness of *animals* to travel;
  - b) *animal identification* (description, number, etc.);
  - c) health status including any tests, treatments and vaccinations carried out;
  - d) when required, details of *disinfection* carried out.

At the time of certification, the *veterinarian* should notify the *animal handler* or the driver of any factors affecting the fitness of *animals* to travel for a particular *journey*.

## Article 7.3.7.

**Pre-journey period**1. General considerations

- a) Pre-journey rest is necessary if the *welfare* of *animals* has become poor during the collection period because of the physical environment or the social behaviour of the *animals*. The need for rest should be judged by a *veterinarian* or other competent person.
- b) Pre-journey assembly/holding areas should be designed to:
  - i) securely hold the *animals*;
  - ii) maintain a safe environment from hazards, including predators and *disease*;
  - iii) protect *animals* from exposure to severe weather conditions;
  - iv) allow for maintenance of social groups;
  - v) allow for rest, and appropriate water and feed.
- c) Consideration should be given to the previous transport experience, training and conditioning of the *animals*, if known, as these may reduce fear and stress in *animals*.
- d) Feed and water should be provided pre-journey if the *journey* duration is greater than the normal inter-feeding and drinking interval for the *animal*. Recommendations for specific-species are described in detail in Article 7.3.12.
- e) When *animals* are to be provided with a novel diet or method of feed or water provision during the *journey*, an adequate period of adaptation should be allowed.
- f) Before each *journey*, *vehicles* and *containers* should be thoroughly cleaned and, if necessary, treated for animal health and public health purposes, using methods approved by the *Competent Authority*. When cleaning is necessary during a *journey*, this should be carried out with the minimum of stress and risks to the *animals*.
- g) Where an *animal handler* believes that there is a significant risk of *disease* among the *animals* to be loaded or significant doubt as to their fitness to travel, the *animals* should be examined by a *veterinarian*.

2. Selection of compatible groups

Compatible groups should be selected before transport to avoid adverse *animal welfare* consequences. The following recommendations should be applied when assembling groups of *animals*:

- a) *Animals* reared together should be maintained as a group; *animals* with a strong social bond, such as a dam and offspring, should be transported together.
- b) *Animals* of the same species can be mixed unless there is a significant likelihood of aggression; aggressive individuals should be segregated (recommendations for specific species are described in detail in Article 7.3.12.). For some species, *animals* from different groups should not be mixed because poor *welfare* occurs unless they have established a social structure.
- c) Young or small *animals* should be separated from older or larger *animals*, with the exception of nursing mothers with young at foot.

Annex E (contd)

- d) *Animals* with horns or antlers should not be mixed with *animals* lacking horns or antlers unless judged to be compatible.
- e) *Animals* of different species should not be mixed unless they are judged to be compatible.

3. Fitness to travel

- a) Each *animal* should be inspected by a *veterinarian* or an *animal handler* to assess fitness to travel. If its fitness to travel is in doubt, the *animal* should be examined by a *veterinarian*. *Animals* found unfit to travel should not be loaded onto a *vehicle*, except for transport to receive veterinary attention.
- b) Humane and effective arrangements should be made by the owner and the agent for the handling and care of any *animal* rejected as unfit to travel.
- c) *Animals* that are unfit to travel include, but may not be limited to:
  - i) those that are sick, injured, weak, disabled or fatigued;
  - ii) those that are unable to stand unaided and bear weight on each leg;
  - iii) those that are blind in both eyes;
  - iv) those that cannot be moved without causing them additional suffering;
  - v) newborn with an unhealed navel;
  - vi) pregnant *animals* which would be in the final 10% of their gestation period at the planned time of *unloading*;
  - vii) females travelling without young which have given birth within the previous 48 hours;
  - viii) those whose body condition would result in poor *welfare* because of the expected climatic conditions.
- d) Risks during transport can be reduced by selecting *animals* best suited to the conditions of travel and those that are acclimatised to expected weather conditions.
- e) *Animals* at particular risk of suffering poor *welfare* during transport and which require special conditions (such as in the design of facilities and *vehicles*, and the length of the *journey*) and additional attention during transport, may include:
  - i) large or obese individuals;
  - ii) very young or old *animals*;
  - iii) excitable or aggressive *animals*;
  - iv) *animals* which have had little contact with humans;
  - v) *animals* subject to motion sickness;

- vi) females in late pregnancy or heavy lactation, dam and offspring;
- vii) *animals* with a history of exposure to stressors or pathogenic agents prior to transport;
- viii) *animals* with unhealed wounds from recent surgical procedures such as dehorning.

#### 4. Specific species requirements

Transport procedures should be able to take account of variations in the behaviour of the species. Flight zones, social interactions and other behaviour vary significantly among species and even within species. Facilities and handling procedures that are successful with one species are often ineffective or dangerous with another.

Recommendations for specific species are described in detail in Article 7.3.12.

Article 7.3.8.

### **Loading**

#### 1. Competent supervision

- a) *Loading* should be carefully planned as it has the potential to be the cause of poor *welfare* in transported *animals*.
- b) *Loading* should be supervised and/or conducted by *animal handlers*. The *animals* are to be loaded quietly and without unnecessary noise, harassment or force. Untrained assistants or spectators should not impede the process.
- c) When *containers* are loaded onto a *vehicle*, this should be carried out in such a way to avoid poor *animal welfare*.

#### 2. Facilities

- a) The facilities for loading including the collecting area, races and loading ramps should be designed and constructed to take into account the needs and abilities of the *animals* with regard to dimensions, slopes, surfaces, absence of sharp projections, flooring, etc.
- b) Loading facilities should be properly illuminated to allow the *animals* to be observed by animal handler(s), and to allow the ease of movement of the *animals* at all times. Facilities should provide uniform light levels directly over approaches to sorting pens, chutes, loading ramps, with brighter light levels inside vehicles/containers, in order to minimise baulking. Dim light levels may be advantageous for the catching of *poultry* and some other *animals*. Artificial lighting may be required. Loading ramps and other facilities should have a non-slippery flooring.
- c) Ventilation during loading and the journey should provide for fresh air, the removal of excessive heat, humidity and noxious fumes (such as ammonia and carbon monoxide), and the prevention of accumulations of ammonia and carbon dioxide. Under warm and hot conditions, ventilation should allow for the adequate convective cooling of each animal. In some instances, adequate ventilation can be achieved by increasing the space allowance for *animals*.

Annex E (contd)3. Goads and other aids

When moving *animals*, their species-specific behaviour should be used (see Article 7.3.12. If goads and other aids are necessary, the following principles should apply:

- a) *Animals* that have little or no room to move should not be subjected to physical force or goads and other aids which compel movement. Electric goads and prods should only be used in extreme cases and not on a routine basis to move *animals*. The use and the power output should be restricted to that necessary to assist movement of an *animal* and only when an *animal* has a clear path ahead to move. Goads and other aids should not be used repeatedly if the *animal* fails to respond or move. In such cases it should be investigated whether some physical or other impediment is preventing the *animal* from moving.
- b) The use of such devices should be limited to battery-powered goads on the hindquarters of pigs and large ruminants, and never on sensitive areas such as the eyes, mouth, ears, anogenital region or belly. Such instruments should not be used on horses, sheep and goats of any age, or on calves or piglets.
- c) Useful and permitted goads include panels, flags, plastic paddles, flappers (a length of cane with a short strap of leather or canvas attached), plastic bags and rattles; they should be used in a manner sufficient to encourage and direct movement of the *animals* without causing undue stress.
- d) Painful procedures (including whipping, tail twisting, use of nose twitches, pressure on eyes, ears or external genitalia), or the use of goads or other aids which cause pain and suffering (including large sticks, sticks with sharp ends, lengths of metal piping, fencing wire or heavy leather belts), should not be used to move *animals*.
- e) Excessive shouting at *animals* or making loud noises (e.g. through the cracking of whips) to encourage them to move should not occur, as such actions may make the *animals* agitated, leading to crowding or falling.
- f) The use of well trained dogs to help with the *loading* of some species may be acceptable.
- g) *Animals* should be grasped or lifted in a manner which avoids pain or suffering and physical damage (e.g. bruising, fractures, dislocations). In the case of quadrupeds, manual lifting by a person should only be used in young *animals* or small species, and in a manner appropriate to the species; grasping or lifting *animals* only by their wool, hair, feathers, feet, neck, ears, tails, head, horns, limbs causing pain or suffering should not be permitted, except in an emergency where *animal welfare* or human safety may otherwise be compromised.
- h) Conscious *animals* should not be thrown, dragged or dropped.
- i) Performance standards should be established in which numerical scoring is used to evaluate the use of such instruments, and to measure the percentage of *animals* moved with an electric instrument and the percentage of *animals* slipping or falling as a result of their usage.

Article 7.3.9.

**Travel**1. General considerations

- a) Drivers and *animal handlers* should check the load immediately before departure to ensure that the *animals* have been properly loaded. Each load should be checked again early in the trip and adjustments made as appropriate. Periodic checks should be made throughout the trip, especially at rest or refuelling stops or during meal breaks when the *vehicle* is stationary.

- b) Drivers should utilise smooth, defensive driving techniques, without sudden turns or stops, to minimise uncontrolled movements of the *animals*.

2. Methods of restraining or containing animals

- a) Methods of restraining *animals* should be appropriate to the species and age of *animals* involved and the training of the individual *animal*.
- b) Recommendations for specific species are described in detail in Article 7.3.12.

3. Regulating the environment within vehicles or containers

- a) *Animals* should be protected against harm from hot or cold conditions during travel. Effective ventilation procedures for maintaining the environment within *vehicles* or *containers* will vary according to whether conditions are cold, hot and dry or hot and humid, but in all conditions a build-up of noxious gases should be prevented.
- b) The environment within *vehicles* or *containers* in hot and warm weather can be regulated by the flow of air produced by the movement of the *vehicle*. In warm and hot weather, the duration of *journey* stops should be minimised and *vehicles* should be parked under shade, with adequate and appropriate ventilation.
- c) To minimise slipping and soiling, and maintain a healthy environment, urine and faeces should be removed from floors when necessary and disposed of in such a way as to prevent the transmission of *disease* and in compliance with all relevant health and environmental legislation.

4. Sick, injured or dead animals

- a) A driver or an *animal handler* finding sick, injured or dead *animals* should act according to a predetermined emergency response plan.
- b) Sick or injured *animals* should be segregated.
- c) Ferries (roll-on roll-off) should have procedures to treat sick or injured *animals* during the *journey*.
- d) In order to reduce the likelihood that animal transport will increase the spread of infectious *disease*, contact between transported *animals*, or the waste products of the transported *animals*, and other farm *animals* should be minimised.
- e) During the *journey*, when disposal of a dead *animal* becomes necessary, this should be carried out in such a way as to prevent the transmission of *disease* and in compliance with all relevant health and environmental legislation.
- f) When *killing* is necessary, it should be carried out as quickly as possible and assistance should be sought from a *veterinarian* or other person(s) competent in humane *killing* procedures. Recommendations for specific species are described in Chapter 7.6. on killing of *animals* for disease control purposes.

5. Water and feed requirements

- a) If *journey* duration is such that feeding or watering is required or if the species requires feed or water throughout, access to suitable feed and water for all the *animals* (appropriate for their species and age) carried in the *vehicle* should be provided. There should be adequate space for all *animals* to move to the feed and water sources and due account taken of likely competition for feed.
- b) Recommendations for specific species are described in detail in Article 7.3.12.

Annex E (contd)6. Rest periods and conditions

- a) *Animals* that are being transported should be rested at appropriate intervals during the *journey* and offered feed and water, either on the *vehicle* or, if necessary, unloaded into suitable facilities.
- b) Suitable facilities should be used en route, when resting requires the *unloading* of the *animals*. These facilities should meet the needs of the particular animal species and should allow access of all *animals* to feed and water.

7. In-transit observations

- a) *Animals* being transported by road should be observed soon after a *journey* is commenced and whenever the driver has a rest stop. After meal breaks and refuelling stops, the *animals* should be observed immediately prior to departure.
- b) *Animals* being transported by rail should be observed at each scheduled stop. The responsible rail transporter should monitor the progress of trains carrying *animals* and take all appropriate action to minimise delays.
- c) During stops, it should be ensured that the *animals* continue to be properly confined, have appropriate feed and water, and their physical condition is satisfactory.

Article 7.3.10.

**Unloading and post-journey handling**1. General considerations

- a) The required facilities and the principles of animal handling detailed in Article 7.3.8. apply equally to *unloading*, but consideration should be given to the likelihood that the *animals* will be fatigued.
- b) *Unloading* should be supervised and/or conducted by an *animal handler* with knowledge and experience of the behavioural and physical characteristics of the species being unloaded. *Animals* should be unloaded from the *vehicle* into appropriate facilities as soon as possible after arrival at the destination but sufficient time should be allowed for *unloading* to proceed quietly and without unnecessary noise, harassment or force.
- c) Facilities should provide all *animals* with appropriate care and comfort, adequate space and ventilation, access to feed (if appropriate) and water, and shelter from extreme weather conditions.
- d) For details regarding the *unloading* of *animals* at a *slaughterhouse*, see Chapter 7.5. on slaughter of animals for human consumption.

2. Sick or injured animals

- a) An *animal* that has become sick, injured or disabled during a *journey* should be appropriately treated or humanely killed (see Chapter 7.6. on killing of *animals* for disease control purposes). If necessary, veterinary advice should be sought in the care and treatment of these *animals*. In some cases, where *animals* are non-ambulatory due to fatigue, injury or sickness, it may be in the best *welfare* interests of the *animal* to be treated or killed aboard the *vehicle*. Assistance should be sought from a *veterinarian* or other person(s) competent in humane *killing* procedures.

- b) At the destination, the *animal handler* or the driver during transit should ensure that responsibility for the *welfare* of sick, injured or disabled *animals* is transferred to a *veterinarian* or other suitable person.
- c) If treatment or humane *killing* is not possible aboard the *vehicle*, there should be appropriate facilities and equipment for the humane *unloading* of *animals* that are non-ambulatory due to fatigue, injury or sickness. These *animals* should be unloaded in a manner that causes the least amount of suffering. After *unloading*, separate pens and other appropriate facilities should be available for sick or injured *animals*.
- d) Feed, if appropriate, and water should be available for each sick or injured *animal*.

### 3. Addressing disease risks

The following should be taken into account in addressing the greater risk of *disease* due to animal transport and the possible need for segregation of transported *animals* at the destination:

- a) increased contact among *animals*, including those from different sources and with different disease histories;
- b) increased shedding of pathogens and increased susceptibility to infection related to stress and impaired defences against disease, including immunosuppression;
- c) exposure of *animals* to pathogens which may contaminate *vehicles*, *resting points*, *markets*, etc.

### 4. Cleaning and disinfection

- a) *Vehicles*, crates, *containers*, etc. used to carry the *animals* should be cleaned before re-use through the physical removal of manure and bedding by scraping, washing and flushing with water and detergent. This should be followed by *disinfection* when there are concerns about disease transmission.
- b) Manure, litter, bedding and the bodies of any *animals* which die during the *journey* should be disposed of in such a way as to prevent the transmission of *disease* and in compliance with all relevant health and environmental legislation.
- c) Establishments like livestock *markets*, *slaughterhouses*, resting sites, railway stations, etc. where *animals* are unloaded should be provided with appropriate areas for the cleaning and *disinfection* of *vehicles*.

Article 7.3.11.

### **Actions in the event of a refusal to allow the completion of the journey**

1. The *welfare* of the *animals* should be the first consideration in the event of a refusal to allow the completion of the *journey*.
2. When the *animals* have been refused import, the *Competent Authority* of the *importing country* should make available suitable isolation facilities to allow the *unloading* of *animals* from a *vehicle* and their secure holding, without posing a risk to the health of national herd or flock, pending resolution of the situation. In this situation, the priorities should be:
  - a) the *Competent Authority* of the *importing country* should provide urgently in writing the reasons for the refusal;
  - b) in the event of a refusal for animal health reasons, the *Competent Authority* of the *importing country* should provide urgent access to a *veterinarian*, where possible an OIE *veterinarian(s)* appointed by the Director General, to assess the health status of the *animals* with regard to the concerns of the *importing country*, and the necessary facilities and approvals to expedite the required diagnostic testing;

Annex E (contd)

- c) the *Competent Authority* of the *importing country* should provide access to allow continued assessment of the health and other aspects of the *welfare* of the *animals*;
  - d) if the matter cannot be promptly resolved, the *Competent Authorities* of the *exporting* and *importing countries* should call on the OIE to mediate.
3. In the event that a *Competent Authority* requires the *animals* to remain on the *vehicle*, the priorities should be:
- a) to allow provisioning of the *vehicle* with water and feed as necessary;
  - b) to provide urgently in writing the reasons for the refusal;
  - c) to provide urgent access to an independent *veterinarian(s)* to assess the health status of the *animals*, and the necessary facilities and approvals to expedite the required diagnostic testing in the event of a refusal for animal health reasons;
  - d) to provide access to allow continued assessment of the health and other aspects of the *welfare* of the *animals*, and the necessary actions to deal with any animal issues which arise.
4. The OIE should utilise its informal procedure for dispute mediation to identify a mutually agreed solution which will address animal health and any other *welfare* issues in a timely manner.

Article 7.3.12.

### **Species-specific issues**

Camelids of the new world in this context comprise llamas, alpacas, guanaco and vicuna. They have good eyesight and, like sheep, can negotiate steep slopes, though ramps should be as shallow as possible. They load most easily in a bunch as a single *animal* will strive to rejoin the others. Whilst they are usually docile, they have an unnerving habit of spitting in self-defence. During transport, they usually lie down. They frequently extend their front legs forward when lying, so gaps below partitions should be high enough so that their legs are not trapped when the *animals* rise.

Cattle are sociable *animals* and may become agitated if they are singled out. Social order is usually established at about two years of age. When groups are mixed, social order has to be re-established and aggression may occur until a new order is established. Crowding of cattle may also increase aggression as the *animals* try to maintain personal space. Social behaviour varies with age, breed and sex; *Bos indicus* and *B. indicus*-cross *animals* are usually more temperamental than European breeds. Young bulls, when moved in groups, show a degree of playfulness (pushing and shoving) but become more aggressive and territorial with age. Adult bulls have a minimum personal space of six square metres. Cows with young calves can be very protective, and handling calves in the presence of their mothers can be dangerous. Cattle tend to avoid “dead end” in passages.

Goats should be handled calmly and are more easily led or driven than if they are excited. When goats are moved, their gregarious tendencies should be exploited. Activities which frighten, injure or cause agitation to *animals* should be avoided. Bullying is particularly serious in goats and can reflect demands for personal space. Housing strange goats together could result in fatalities, either through physical violence, or subordinate goats being refused access to food and water.

Horses in this context include donkeys, mules and hinnies. They have good eyesight and a very wide angle of vision. They may have a history of *loading* resulting in good or bad experiences. Good training should result in easier *loading*, but some horses can prove difficult, especially if they are inexperienced or have associated *loading* with poor transport conditions. In these circumstances, two experienced *animal handlers* can load an *animal* by linking arms or using a strop below its rump. Blindfolding may even be considered. Ramps should be as shallow as possible. Steps are not usually a problem when horses mount a ramp, but they tend to jump a step when descending, so steps should be as low as possible. Horses benefit from being individually stalled, but may be transported in compatible groups. When horses are to travel in groups, their shoes should be removed. Horses are prone to respiratory *disease* if they are restricted by period by tethers that prevent the lowering and lifting of their heads.

Pigs have poor eyesight, and may move reluctantly in unfamiliar surroundings. They benefit from well lit loading bays. Since they negotiate ramps with difficulty, these should be as level as possible and provided with secure footholds. Ideally, a hydraulic lift should be used for greater heights. Pigs also negotiate steps with difficulty. A good 'rule-of-thumb' is that no step should be higher than the pig's front knee. Serious aggression may result if unfamiliar *animals* are mixed. Pigs are highly susceptible to heat stress. Pigs are susceptible to motion sickness when in transit. Feed deprivation prior to *bading* may be beneficial to prevent motion sickness.

Sheep are sociable *animals* with good eyesight, a relatively subtle and undemonstrative behaviour and a tendency to "flock together", especially when they are agitated. They should be handled calmly and their tendency to follow each other should be exploited when they are being moved. Crowding of sheep may lead to damaging aggressive and submissive behaviours as *animals* try to maintain personal space. Sheep may become agitated if they are singled out for attention, or kept alone, and will strive to rejoin the group. Activities which frighten, injure or cause agitation to sheep should be avoided. They can negotiate steep ramps.

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## CHAPTER 7.4.

## TRANSPORT OF ANIMALS BY AIR

## Article 7.4.1.

**Livestock containers**1. Design

## a) General principles of design

The *container* should:

- conform to the size of the standard pallet of the aircraft that will be used to transport *animals*; the common sizes are: 224 x 318 cm (88 x 125 in.) and 244 x 318 cm (96 x 125 in.);
- not be constructed of material that could be harmful to the *animals* health or *welfare*;
- allow observation of the *animals* and be marked on opposite sides with the International Air Transport Association (IATA) symbols which indicate *animals* and the upright position;
- allow emergency access to *animals*;
- allow the *animal* to stand in its normal position without touching the roof of the *container* or, in the case of open *containers*, the restraining nets, and provide at least 10 cm (4 in.) clearance above the *animal's* head when standing in its normal position; in the case of horses, provide sufficient space above the horses head (21 cm, 8in. recommended) to allow for the movement required to maintain the horses balance;
- protect the *animals* from adverse weather;
- ensure *animals* stand on a suitable floor to prevent slipping or injury;
- have adequate strength to ensure the safety of the *animals* and to prevent the *animals* from escaping;
- ensure doors can be opened and closed easily, but be secured so that they cannot be opened accidentally;
- be free of any nails, bolts and other protrusions or sharp edges that could cause injuries;
- be designed to minimise the risk of any opening or space entrapping any portion of the *animals* body;
- if reusable, crates should be constructed of impermeable material that is easily cleaned and disinfected;

Annex E (contd)

- ensure faeces and urine cannot escape from the crate; this requires a minimum upturn of 20 cm but it must not block any ventilation openings;
- if designated for stacking be stable, not block any ventilation space and prevent urine and faeces from leaking into the *containers* below when stacked;
- allow for a facility for provision of water and possibly food during transportation of longer than 6 hours duration.

## b) Ventilation

The *container* design should:

- provide adequate ventilation taking into consideration the species stocking density, maximum temperature and humidity of the points of departure, destination, and any interim technical stops;
- allow the normal resting or sleeping position to be assumed for certain species and juvenile *animals*;
- ensure there is no dead air space in the *container*;
- provide ventilation openings on the walls equal to at least 16% of the wall area; this may be reduced if the *container* has an open top;
- in the case of two-tiered *containers*, ventilation in the sides should be for cattle equivalent to not less than 20% of the floor area of each deck, and for pigs and sheep up to 40% of the floor area of each deck;
- have ventilation openings on all four sides of the crate except that two walls may have reduced ventilation space and the other walls have increased space where required by the positioning of the crates during transportation and/or the ventilation pattern of the aircraft;
- ensure that any internal supports or dividers do not block the cross ventilation;
- not have a solid wall above the height of the animal's head in normal resting position;
- in those species where the mouth is normally held near the floor, have at least 25 cm (10 in.) of ventilation space at the level of the *animals*' head; this opening should be divided in two with a maximum height for any opening of 13 cm; in all *containers*, there should be a sufficiently large ventilation opening at a height of 25 cm to 30 cm (10 to 11 in.) above floor level on all four sides to allow for circulation;
- have some physical means of ensuring the ventilation space is not blocked, such as the use of cleats (wedges) or allowing space between the outside of the container and the pallet.

2. Species requirements

In general, fractious *animals* or *animals* in late pregnancy should not be transported by air (see Article 7.4.2).

## a) Horses

Should be transported in *containers* and be separated from each other if they are more than 145 cm (57 in.) in height.

Crates used to transport horses should:

- be strong enough to prevent unruly horses from breaking or escaping from the *container* under any circumstances;
- in the case of multi-horse *containers*, have partitions of sufficient strength and size to separate the horses and to support each horse's weight;
- adjust to allow mare and foal to travel together;
- provide the same percentage of open space for ventilation as required in point 1 above, divided between the two side walls; however, if the access doors are constructed in such a manner that they may be left open during the flight, the door space may be included in the ventilation space;
- be constructed to minimise noise;
- allow access to the head during the flight;
- have the front end notched and padded to accept the neck of the *animal*;
- have a secure point for attaching restraining devices;
- have a front and rear barrier that will restrict the movement of the horse and will ensure that liquids are deflected into the *container*;
- ensure horses cannot bite other *animals*;
- be constructed to resist kicking;
- have no fittings or projections in the area likely to be kicked, metal plates should be covered with a protective material;
- ramps shall be non-skid in nature, have foot battens, and be of a maximum slope of 25 degrees when the *container* is on a standard 50 cm (20 in.) dolly;
- not have a step up or down of more than 25 cm (10 in.).

b) Swine

- Crate design and shipment planning should recognize that swine are extremely susceptible to high heat and humidity and that they normally carry their head near the floor.
- In the use of multi-tiered crates, special attention should be paid to ensure air can move through the crate, in accordance with the aircraft's ventilation pattern and capacity to remove heat.
- Crate construction should take into consideration the tendency for mature swine to chew.
- Litter should be dust-free, shavings or other non toxic materials may be used but not sawdust.
- *Containers* for immature swine should only be constructed when flight is imminent, since rapid growth can result in undersized *containers* if the flight is delayed.
- In order to reduce fighting, swine shipped in group pens should be housed together as a group prior to shipment and not be mixed with other swine before *loading* on the aircraft.

Annex E (contd)

- Mature boars and incompatible females should be shipped in individual crates.
- Individual crates should be 20 cm (8 in.) longer than the body, 15 cm (6 in.) higher than the loin of the pig and of sufficient width, to allow the pigs to lie on their side.

## c) Cattle

Crates used to transport cattle should:

- if multi-tiered or roofed, have at least 33% of the roof and four walls as open space;
- have at least one ventilation opening 20-25 cm (8-10 in.) above the floor which is of such width that it will not cause injuries to the feet.

Adult bulls should be transported separately unless they have been accustomed to each other. Cattle with and without horns should be separated from each other.

d) Poultry

- Crates/containers containing *poultry* should be handled and carried carefully with now unnecessary tilting
- The majority of birds transported by air will be newly hatched chicks. These *animals* are very vulnerable to sudden changes in temperature.

e) Other species

- *Animals* that normally exhibit a herding instinct, including buffalo and deer, can be shipped in group *containers* providing the mental and physical characteristics of the species are taken into consideration.
- All crates used to move such *animals* should have a roof or other method of preventing the *animals* from escaping.
- *Animals* in which the horns or antler cannot be removed, should be transported individually.
- Deer should not be transported in velvet nor in rut.

Article 7.4.2.

**Recommendations for pregnant animals**

Heavily pregnant *animals* should not be carried except under exceptional circumstances. Pregnant *animals* should not be accepted when the last service or exposure to a male prior to departure has exceeded the following time given here for guidance only:

Females	Maximum number of days since the last service or successful mating
Horses	300
Cows	250
Deer (axis, fallow and sika)	170
(red deer, reindeer)	185
Ewes (sheep)	115
Nannies (goats)	115
Sows (pigs)	90

Where service dates or date of last exposure to a male successful mating are not available, the *animals* should be examined by a *veterinarian* to ensure that pregnancy is not so advanced that *animals* are likely to give birth during transport or suffer unnecessarily.

Any *animal* showing udder engorgement and slackening of the pelvic ligament should be refused.

Article 7.4.3.

### Stocking density

The current *stocking densities* agreed by the International Air Transport Association (IATA) should continue to be accepted. However, the graphs giving the space requirements should be extended to take into account *animals* larger and smaller than those dealt with currently.

#### 1. General considerations

When calculating stocking rates, the following should be taken into account:

- a) it is essential that accurate weights of *animals* are obtained in view of the limitations imposed by the load capabilities of the aircraft and the space required per *animal*;
- b) in narrow bodied aircraft, there is a loss of floor area in the upper tier of two-tier penning due to the contours of the aircraft;
- c) space available should be calculated on the inside measurements of the crates or penning system used, not on the floor space of the aircraft;
- d) multi-tiered crates, high outdoor temperatures at departure, arrival or stopover points, or extreme length of the trip will require an increase in the amount of space per *animal*; a 10% decrease in *stocking density* is recommended for trips in excess of 24 hours;
- e) special attention should be paid to the transport of sheep in heavy wool which require an increase in space allotted per *animal* and to pigs which have limited ability to dissipate heat;
- f) *animals* confined in groups, especially in pens, should be stocked at a high enough density to prevent injuries at take-off, during turbulence and at landing, but not to the extent that individual *animals* cannot lie down and rise without risk of injury or crushing;

Annex E (contd)

- g) in multi-tiered shipments, it should be recognized that the ventilation and cooling capacity of the aircraft is the limiting factor, especially in narrow bodied aircraft. Ventilation capacity varies on each individual aircraft and between aircraft of the same model.

2. Recommendations for stocking densities

The following table gives *stocking density* recommendations for different domestic species. The values are expressed in kilograms and metres.

Species	Weight	Density	Space/ animal	No. of animals per	Animals per single tier pallet		
					10 m <sup>2</sup>	214x264 cm	214x308 cm
	kg	kg/m <sup>2</sup>	m <sup>2</sup>	10 m <sup>2</sup>	214x264 cm	214x308 cm	234x308 cm
Calves	50	220	0.23	43	24	28	31
	70	246	0.28	35/6	20	23	25
	80	266	0.30	33	18	21	24
	90	280	0.32	31	17	20	22
Cattle	300	344	0.84	11-12	6	7	8
	500	393	1.27	8	4	5	5
	600	408	1.45	6-7	3-4	4	4-5
	700	400	1.63	6	3	3-4	4
Sheep	25	147	0.17	59	32	37	42
	70	196	0.36	27/8	15	18	20
Pigs	25	172	0.15	67	37	44	48
	100	196	0.51	20	10	12	14

Article 7.4.4.

**Preparation for air transport of livestock**1. Health and customs requirements

The legal requirements including animal health, *welfare* and species conservation, should be ascertained from the country of destination and any in *transit countries* before the *animals* are assembled or the transportation is arranged.

Contact the *Veterinary Authorities* in the country of origin regarding veterinary certification.

Planning of the transportation should take into account weekends, holidays and airport closures.

Verify that any proposed intransit stops or alternates will not jeopardise the importing or in *transit countries* health requirements.

Waiting time at customs (cargo handling and clearance) should be reduced as much as possible to avoid welfare problems.

## 2. Environment

*Animals* are affected by extremes of temperature. This is especially true of high temperature when compounded by high humidity. Temperature and humidity should therefore be taken into consideration when planning the shipment.

Times of arrival, departure and stopovers should be planned so that the aircraft lands during the coolest hours.

At outside temperatures of below 25°C at the landing point, the aircraft doors should be opened to ensure adequate ventilation. Confirmation should be received from government authorities that animal health legislation does not prevent opening of aircraft doors.

When outside temperatures at any landing point exceed 25°C, prior arrangements should be made to have an adequate air-conditioning unit available when the plane lands.

## 3. Facilities and equipment

Specific arrangements must be made to ensure that holding and *loading* facilities including ramps, trucks, and air-conditioning units are available at departure, all in transit and arrival airports. This should include identification of specific staff who are responsible and the method of contacting them, e.g. telephone number and address.

Specific notification must be given to all those responsible for providing facilities or equipment at the destination and in transit stops immediately before departure.

*Containers* should be loaded so as to ensure access can be made to the *animals* at all times.

## 4. Preparation of animals

Vaccination must be done far enough in advance of the departure date to allow for immunity to develop.

Veterinary certification and serological testing must be arranged several weeks in advance of livestock shipment.

Many *animals* require acclimatisation before they are transported. *Animals* such as swine and wild herbivores must be separated and held in the groups that will occupy *containers*. Mixing of such *animals* immediately before or during transport is extremely stressing and should be avoided.

Incompatible *animals* should be transported singly.

Article 7.4.5.

## **Disinfection and disinfestation**

### 1. Disinfection

a) Those parts of the interior of the aircraft destined for the carriage of *animals* should be thoroughly cleaned of all foreign matters using methods acceptable to aircraft management before being loaded.

b) These parts should be sprayed with a disinfectant:

i) suitable for the *diseases* which could be carried by the *animals*;

Annex E (contd)

- ii) that does not cause problems with the aircraft;
- iii) that will not leave a residue hazardous to the *animals* being transported.

If in doubt, the airline should be consulted on the suitability of the disinfectant. A mechanical nebuliser should be used to minimise the amount of disinfectant used.

Suggested disinfectants currently in use are:

- iv) 4% sodium carbonate and 0.1% sodium silicate;
  - v) 0.2% citric acid.
- c) All removeable equipment, penning and *containers* including loading ramps should be thoroughly cleaned and disinfected in accordance with the requirements of both the *exporting* and *importing countries*.
  - d) After *disinfection*, all equipment to be replaced in the aircraft should be washed with clean water to remove any traces of disinfectant to avoid any damage to the aircraft structures.

## 2. Disinfestation

Where *disinfestation* is required, the country requesting the action should be consulted for appropriate procedures.

The World Health Organisation (WHO) Recommendations on the Disinsectisation of Aircraft (*WHO Weekly Epidem. Rec.*, No. 7, 1985) are recognised as standard.

Article 7.4.6.

## **Radiation**

Radioactive materials must be separated from live *animals* by a distance of at least 0.5 metre for journeys not exceeding 24 hours, and by a distance of at least 1.0 metre for journeys longer than 24 hours (reference: Technical instructions on storage and loading-separation of the International Civil Aviation Organisation). Special care should be taken with regard to pregnant *animals*, semen and embryos/ova.

Article 7.4.7.

## **Tranquilization**

Experience has shown that there is considerable risk in sedating *animals* transported by air. Tranquilizers reduce the ability of the *animals* to respond to stress during transportation. In addition, the reaction of various species to tranquilization cannot always be foreseen. For these reasons, routine tranquilization is not recommended. Tranquilizers should only be used when a specific problem exists, and should be administered by a *veterinarian* or by a person who has been instructed in their use. Persons using these drugs should understand the full implications of the effects of the drug in air transport, e.g. certain *animals* such as horses and elephants should not go down in *containers*. Drugs should only be administered during the flight with the knowledge and consent of the captain.

In all cases, when tranquilizers are used, a note should be attached to the *container* stating the weight of the individual *animal*, the generic name of the drug used, the dose, the method and time of administration.

## Article 7.4.8.

**Destruction of carcasses**

In the event of any animal *death* on board, the competent authority of the airport of destination should be notified in advance of landing.

Carcasses should be disposed of under the supervision of and to the satisfaction of the *Veterinary Authority* of the country the aircraft is in.

The method of disposal should be based on the risk of introducing a controlled *disease*.

For carcasses which represent a high risk of introducing *disease*, the following is recommended:

1. destruction by incineration, rendering or deep burial under the supervision of the *Veterinary Authority*;
2. if removed from the airport site, transportation in a closed, leakproof *container*.

## Article 7.4.9.

**Emergency slaughter**

Emergency *slaughter* of *animals* in aircraft should, in general, only occur when the safety of the aircraft, crew or other *animals* are involved.

Every aircraft transporting *animals* should have a method of killing the *animals* with minimum pain and someone trained in that method.

In all cases when horses or other large *animals* are to be carried, the method of killing should be discussed with the airline during the planning stages. Suitable methods are:

1. Captive bolt stunner, followed by an injection of a lethal chemical
  - a) Operator should be trained to use the captive bolt stunner on the species or type of *animal* being transported.
  - b) An expert should determine that the type of captive bolt pistol is adequate for all the *animals* being transported.
  - c) Some airlines and countries may prohibit the carriage of captive bolt pistols.
  - d) The user should recognise that the noise associated with the captive bolt may excite other *animals*.
  - e) The requirement that the captive bolt pistol is accurately centered may be difficult to achieve with an excited *animal*.
2. Injection of a chemical
  - a) Various chemicals may be used to sedate, immobilize or kill *animals*.
  - b) Central nervous system depressants such as barbiturate euthanasia solutions must be injected directly into a vein to be effective. This is not normally practical for anyone but an experienced *veterinarian* or an especially trained and experienced attendant, where the *animal* is sufficiently fractious to require euthanasia.

Annex E (contd)

- c) Sedatives such as promazine and its derivatives may make the *animal* more fractious (see Article 7.4.7.).
- d) Immobilizing solutions such as succinylcholine are not humane.

3. Firearms

Airlines do not permit the use of firearms which discharge a free bullet because of the danger to the aircraft.

Article 7.4.10.

**Handling of food and waste material**

Waste material which contains anything of animal origin including food, litter, manure, or animal feed should be handled, collected and disposed of in a manner that ensures it will not be fed to livestock. It should be collected in specified areas, and stored and transported in closed, leakproof *containers*.

Some *importing countries* legislation may prohibit or restrict the use of hay or straw during the transportation period. Unloading of hay, straw, other animal feed and litter may be restricted or prohibited by in *transit countries*.

Article 7.4.11.

**Disposal of food and waste material**

Recommended methods of disposal are:

- a) incineration to an ash;
- b) heating at an internal temperature of at least of 100°C for 30 minutes, then disposal in a land fill site;
- c) controlled burial in a land fill site.

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## CHAPTER 7.5.

# SLAUGHTER OF ANIMALS

### Article 7.5.1.

#### General principles

##### 1. Object

These recommendations address the need to ensure the *welfare* of food *animals* during pre-slaughter and slaughter processes, until they are dead.

These recommendations apply to the *slaughter* in *slaughterhouses* of the following domestic *animals*: cattle, buffalo, bison, sheep, goats, camelids, deer, horses, pigs, ratites, rabbits and *poultry*. Other *animals*, wherever they have been reared, and all *animals* slaughtered outside *slaughterhouses* should be managed to ensure that their *transport*, *lairage*, *restraint* and *slaughter* is carried out without causing undue stress to the *animals*; the principles underpinning these recommendations apply also to these *animals*.

##### 2. Personnel

Persons engaged in the *unloading*, moving, *lairage*, care, *restraint*, *stunning*, *slaughter* and bleeding of *animals* play an important role in the *welfare* of those *animals*. For this reason, there should be a sufficient number of personnel, who should be patient, considerate, competent and familiar with the recommendations outlined in the present Chapter and their application within the national context.

Competence may be gained through formal training and/or practical experience. This competence should be demonstrated through a current certificate from the *Competent Authority* or from an independent body accredited by the *Competent Authority*.

The management of the *slaughterhouse* and the *Veterinary Services* should ensure that *slaughterhouse* staff are competent and carry out their tasks in accordance with the principles of *animal welfare*.

##### 3. Animal behaviour

*Animal handlers* should be experienced and competent in handling and moving farm livestock, and understand the behaviour patterns of *animals* and the underlying principles necessary to carry out their tasks.

The behaviour of individual *animals* or groups of *animals* will vary, depending on their breed, sex, temperament and age and the way in which they have been reared and handled. Despite these differences, the following behaviour patterns which are always present to some degree in domestic *animals*, should be taken into consideration in handling and moving the *animals*.

Most domestic livestock are kept in **herds groups** and follow a leader by instinct.

*Animals* which are likely to harm each other in a group situation should not be mixed at *slaughterhouses*.

The desire of some *animals* to control their personal space should be taken into account in designing facilities.

Annex E (contd)

Domestic *animals* will try to escape if any person approaches closer than a certain distance. This critical distance, which defines the flight zone, varies among species and individuals of the same species, and depends upon previous contact with humans. *Animals* reared in close proximity to humans i.e. tame have a smaller flight zone, whereas those kept in free range or extensive systems may have flight zones which may vary from one metre to many metres. *Animal handlers* should avoid sudden penetration of the flight zone which may cause a panic reaction which could lead to aggression or attempted escape.

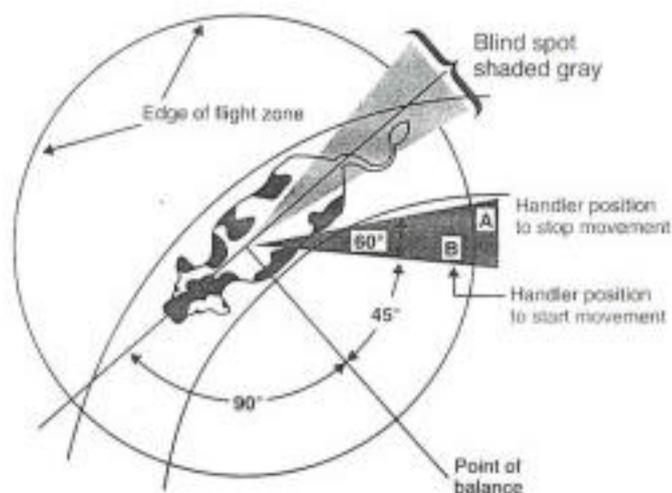
*Animal handlers* should use the point of balance at the *animal's* shoulder to move *animals*, adopting a position behind the point of balance to move an *animal* forward and in front of the point of balance to move it backward.

Domestic *animals* have wide-angle vision but only have limited forward binocular vision and poor perception of depth. This means that they can detect objects and movements beside and behind them, but can only judge distances directly ahead.

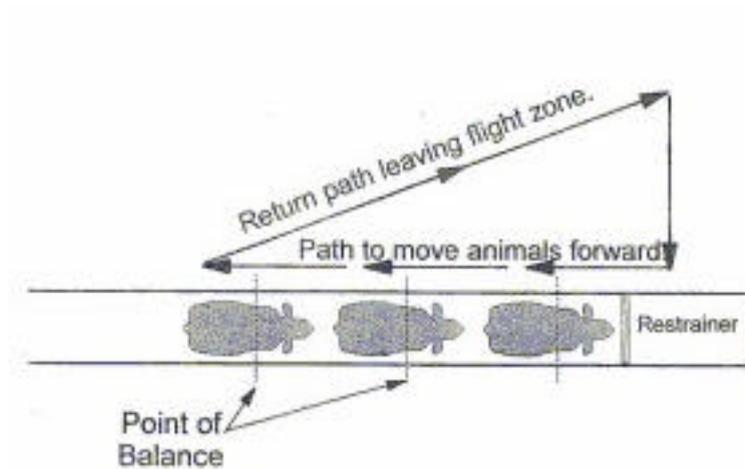
Although **all most** domestic *animals* have a highly sensitive sense of smell, they react in different ways to the smells of *slaughterhouses*. Smells which cause fear or other negative responses should be taken into consideration when managing *animals*.

Domestic *animals* can hear over a greater range of frequencies than humans and are more sensitive to higher frequencies. They tend to be alarmed by constant loud noise and by sudden noises, which may cause them to panic. Sensitivity to such noises should also be taken into account when handling *animals*.

### An example of a flight zone (cattle)



### Handler movement pattern to move cattle forward



#### 4. Distractions and their removal

Distractions that may cause approaching *animals* to stop, baulk or turn back should be designed out from new facilities or removed from existing ones. Below are examples of common distractions and methods for eliminating them:

- a) reflections on shiny metal or wet floors — move a lamp or change lighting;
- b) dark entrances to chutes, races, stun boxes or conveyor restrainers — illuminate with indirect lighting which does not shine directly into the eyes of approaching *animals*;
- c) *animals* seeing moving people or equipment up ahead — install solid sides on chutes and races or install shields;
- d) dead ends — avoid if possible by curving the passage, or make an illusory passage;
- e) chains or other loose objects hanging in chutes or on fences — remove them;
- f) uneven floors or a sudden drop in floor levels at the entrance to conveyor restrainers — avoid uneven floor surfaces or install a solid floor under the restrainer to provide an illusion of a solid and continuous walking surface. These lairage conditions may not apply to poultry.
- g) sounds of air hissing from pneumatic equipment — install silencers or use hydraulic equipment or vent high pressure to the external environment using flexible hosing;
- h) clanging and banging of metal objects — install rubber stops on gates and other devices to reduce metal to metal contact;
- i) air currents from fans or air curtains blowing into the face of *animals* — redirect or reposition equipment. These conditions may not apply to poultry.

## Moving and handling animals

### 1. General considerations

*Animals* should be transported to *slaughter* in a way that minimises adverse animal health and *welfare* outcomes, and the transport should be conducted in accordance with the OIE recommendations for the transportation of *animals* (Chapters 7.2. and 7.3.).

The following principles should apply to *unloading animals*, moving them into *lairage* pens, out of the *lairage* pens and up to the *slaughter* point:

- a) The conditions of the *animals* should be assessed upon their arrival for any *animal welfare* and health problems.
- b) Injured or sick *animals*, requiring immediate slaughter, should be killed humanely and without delay, in accordance with the recommendations of the OIE.
- c) *Animals* should not be forced to move at a speed greater than their normal walking pace, in order to minimise injury through falling or slipping. Performance standards should be established where numerical scoring of the prevalence of *animals* slipping or falling is used to evaluate whether animal moving practices and/or facilities should be improved. In properly designed and constructed facilities with competent *animal handlers*, it should be possible to move 99% of *animals* without their falling. These conditions may not apply to poultry.
- d) *Animals* for *slaughter* should not be forced to walk over the top of other *animals*.
- e) *Animals* should be handled in such a way as to avoid harm, distress or injury. Under no circumstances should *animal handlers* resort to violent acts to move *animals*, such as crushing or breaking tails of *animals*, grasping their eyes or pulling them by the ears. *Animal handlers* should never apply an injurious object or irritant substance to *animals* and especially not to sensitive areas such as eyes, mouth, ears, anogenital region or belly. The throwing or dropping of *animals*, or their lifting or dragging by body parts such as their tail, head, horns, ears, limbs, wool, hair or feathers, should not be permitted. The manual lifting of small *animals* is permissible.
- f) When using goads and other aids, the following principles should apply:
  - i) *Animals* that have little or no room to move should not be subjected to physical force or goads and other aids which compel movement. Electric goads and prods should only be used in extreme cases and not on a routine basis to move *animals*. The use and the power output should be restricted to that necessary to assist movement of an *animal* and only when an *animal* has a clear path ahead to move. Goads and other aids should not be used repeatedly if the *animal* fails to respond or move. In such cases it should be investigated whether some physical or other impediment is preventing the *animal* from moving.
  - ii) The use of such devices should be limited to battery-powered goads on the hindquarters of pigs and large ruminants, and never on sensitive areas such as the eyes, mouth, ears, anogenital region or belly. Such instruments should not be used on horses, sheep and goats of any age, or on calves or piglets.
  - iii) Useful and permitted goads include panels, flags, plastic paddles, flappers (a length of cane with a short strap of leather or canvas attached), plastic bags and metallic rattles; they should be used in a manner sufficient to encourage and direct movement of the *animals* without causing undue stress.

- iv) Painful procedures (including whipping, tail twisting, use of nose twitches, pressure on eyes, ears or external genitalia), or the use of goads or other aids which cause pain and suffering (including large sticks, sticks with sharp ends, lengths of metal piping, fencing wire or heavy leather belts), should not be used to move *animals*.
- v) Excessive shouting at *animals* or making loud noises (e.g. through the cracking of whips) to encourage them to move should not occur, as such actions may make the *animals* agitated, leading to crowding or falling.
- vi) *Animals* should be grasped or lifted in a manner which avoids pain or suffering and physical damage (e.g. bruising, fractures, dislocations). In the case of quadrupeds, manual lifting by a person should only be used in young *animals* or small species, and in a manner appropriate to the species; grasping or lifting such *animals* only by their wool, hair, feathers, feet, neck, ears, tails, head, horns, limbs causing pain or suffering should not be permitted, except in an emergency where *animal welfare* or human safety may otherwise be compromised.
- vii) Conscious *animals* should not be thrown, dragged or dropped.
- viii) Performance standards should be established to evaluate the use of such instruments. Numerical scoring may be used to measure the percentage of *animals* moved with an electric instrument and the percentage of *animals* slipping or falling at a point in the *slaughterhouse*. Any risk of compromising *animal welfare*, for example slippery floor, should be investigated immediately and the defect rectified to eliminate the problem.

## 2. Specific considerations for poultry

Stocking density in transport crates should be optimum to suit climatic conditions and maintain species-specific thermal comfort within containers.

Care is especially necessary during *loading* and *unloading* to avoid wings being caught, leading to dislocated or broken wing bones in conscious birds. Such injuries will adversely affect carcass and *meat* quality.

Modular systems that involve tipping of live birds are not conducive to maintaining good *animal welfare*. These systems, when used, should be incorporated with a mechanism to facilitate birds sliding out of the transport system, rather than being dropped or dumped on top of each other from heights of more than a metre.

Birds may get trapped or their wings or claws may get caught in the fixtures, mesh or holes in the poorly designed and/or constructed transport systems. Under this situation, operator unloading birds should ensure gentle release of trapped birds.

Drawers in modular systems and crates should be stacked and destacked carefully so as to avoid injury to birds.

All birds should be sufficient space to all lie down at the same time without being on top of each other.

Birds with broken bone(s) and/or dislocated joint(s) should be humanely killed before being hung on shackles for processing.

The number of *poultry* arriving at the processing plant with dislocated joint(s) and/or broken bone(s) should be recorded verifiably. For *poultry*, the percentage of chickens with broken or dislocated wings should not exceed 2%. A frequency of less than 1% should be the goal.

## Annex E (contd)

**3.2. Provisions relevant to animals delivered in containers**

- a) *Containers* in which *animals* are transported should be handled with care, and should not be thrown, dropped or knocked over. Where possible, they should be horizontal while being loaded and unloaded mechanically, and stacked to ensure ventilation. In any case they should be moved and stored in an upright position as indicated by specific marks.
- b) *Animals* delivered in *containers* with perforated or flexible bottoms should be unloaded with particular care in order to avoid injury. Where appropriate, *animals* should be unloaded from the *containers* individually.
- c) *Animals* which have been transported in *containers* should be slaughtered as soon as possible; mammals and ratites which are not taken directly upon arrival to the place of *slaughter* should have drinking water available to them from appropriate facilities at all times. Delivery of *poultry* for *slaughter* should be scheduled such that they are not deprived of water at the premises for longer than 12 hours. *Animals* which have not been slaughtered within 12 hours of their arrival should be fed, and should subsequently be given moderate amounts of food at appropriate intervals.

**3.3. Provisions relevant to restraining and containing animals**

- a) Provisions relevant to *restraining animals* for *stunning* or *slaughter* without *stunning*, to help maintain *animal welfare*, include:
  - i) provision of a non-slippery floor;
  - ii) avoidance of excessive pressure applied by *restraining* equipment that causes struggling or vocalisation in *animals*;
  - iii) equipment engineered to reduce noise of air hissing and clanging metal;
  - iv) absence of sharp edges in *restraining* equipment that would harm *animals*;
  - v) avoidance of jerking or sudden movement of *restraining* device.
- b) Methods of *restraint* causing avoidable suffering should not be used in conscious *animals* because they cause severe pain and stress:
  - i) suspending or hoisting *animals* (other than *poultry*) by the feet or legs;
  - ii) indiscriminate and inappropriate use of *stunning* equipment;
  - iii) mechanical clamping of the legs or feet of the *animals* (other than shackles used in *poultry* and ostriches) as the sole method of *restraint*;
  - iv) breaking legs, cutting leg tendons or blinding *animals* in order to immobilise them;
  - v) severing the spinal cord, for example using a puntilla or dagger, to immobilise *animals* using electric currents to immobilise *animals*, except for proper *stunning*.

## Article 7.5.3.

**Lairage design and construction**1. General considerations

The *lairage* should be designed and constructed to hold an appropriate number of *animals* in relation to the throughput rate of the *slaughterhouse* without compromising the *welfare* of the *animals*.

In order to permit operations to be conducted as smoothly and efficiently as possible without injury or undue stress to the *animals*, the *lairage* should be designed and constructed so as to allow the *animals* to move freely in the required direction, using their behavioural characteristics and without undue penetration of their flight zone.

The following recommendations may help to achieve this. **Some of these conditions may not apply to poultry.**

2. Design of lairage

- a) The *lairage* should be designed to allow a one-way flow of *animals* from *unloading* to the point of *slaughter*, with a minimum number of abrupt corners to negotiate.
- b) In red meat *slaughterhouses*, pens, passageways and races should be arranged in such a way as to permit inspection of *animals* at any time, and to permit the removal of sick or injured *animals* when considered to be appropriate, for which separate appropriate accommodation should be provided.
- c) Each *animal* should have room to stand up and lie down and, when confined in a pen, to turn around, except where the *animal* is reasonably restrained for safety reasons (e.g. fractious bulls). Fractious *animals* should be slaughtered as soon as possible after arrival at the *slaughterhouse* to avoid *welfare* problems. The *lairage* should have sufficient accommodation for the number of *animals* intended to be held. Drinking water should always be available to the *animals*, and the method of delivery should be appropriate to the type of *animal* held. Troughs should be designed and installed in such a way as to minimise the risk of fouling by faeces, without introducing risk of bruising and injury in *animals*, and should not hinder the movement of *animals*.
- d) Holding pens should be designed to allow as many *animals* as possible to stand or lie down against a wall. Where feed troughs are provided, they should be sufficient in number and feeding space to allow adequate access of all *animals* to feed. The feed trough should not hinder the movement of *animals*.
- e) Where tethers, ties or individual stalls are used, these should be designed so as not to cause injury or distress to the *animals* and should also allow the *animals* to stand, lie down and access any food or water that may need to be provided.
- f) Passageways and races should be either straight or consistently curved, as appropriate to the animal species. Passageways and races should have solid sides, but when there is a double race, the shared partition should allow adjacent *animals* to see each other. For pigs and sheep, passageways should be wide enough to enable two or more *animals* to walk side by side for as long as possible. At the point where passageways are reduced in width, this should be done by a means which prevents excessive bunching of the *animals*.
- g) *Animal handlers* should be positioned alongside races and passageways on the inside radius of any curve, to take advantage of the natural tendency of *animals* to circle an intruder. Where one-way gates are used, they should be of a design which avoids bruising. Races should be horizontal but where there is a slope, they should be constructed to allow the free movement of *animals* without injury.

Annex E (contd)

- h) There should be a waiting pen, with a level floor and solid sides, between the holding pens and the race leading to the point of *stunning* or *slaughter*, to ensure a steady supply of *animals* for *stunning* or *slaughter* and to avoid having *animal handlers* trying to rush *animals* from the holding pens. The waiting pen should preferably be circular, but in any case, so designed that *animals* cannot be trapped or trampled.
- i) Ramps or lifts should be used for the *loading* and *unloading* of *animals* where there is a difference in height or a gap between the floor of the *vehicle* and the *unloading* area. Unloading ramps should be designed and constructed so as to permit *animals* to be unloaded from *vehicles* on the level or at the minimum gradient achievable. Lateral side protection should be available to prevent *animals* escaping or falling. They should be well drained, with secure footholds and adjustable to facilitate easy movement of *animals* without causing distress or injury.

3. Construction of lairage

- a) *Lairages* should be constructed and maintained so as to provide protection from unfavourable climatic conditions, using strong and resistant materials such as concrete and metal which has been treated to prevent corrosion. Surfaces should be easy to clean. There should be no sharp edges or protuberances which may injure the *animals*.
- b) Floors should be well drained and not slippery; they should not cause injury to the feet of the *animals*. Where necessary, floors should be insulated or provided with appropriate bedding. Drainage grids should be placed at the sides of pens and passageways and not where *animals* would have to cross them. Discontinuities or changes in floor patterns or texture which could cause baulking in the movement of *animals* should be avoided.
- c) *Lairages* should be provided with adequate lighting, but care should be taken to avoid harsh lights and shadows, which frighten the *animals* or affect their movement. The fact that *animals* will move more readily from a darker area into a well-lit area might be exploited by providing for lighting that can be regulated accordingly.
- d) *Lairages* should be adequately ventilated to ensure that waste gases (e.g. ammonia) do not build up and that draughts at animal height are minimised. Ventilation should be able to cope with the range of expected climatic conditions and the number of *animals* the *lairage* will be expected to hold.
- e) Care should be taken to protect the *animals* from excessively or potentially disturbing noises, for example by avoiding the use of noisy hydraulic or pneumatic equipment, and muffling noisy metal equipment by the use of suitable padding, or by minimising the transmission of such noises to the areas where *animals* are held and slaughtered.
- f) Where *animals* are kept in outdoor *lairages* without natural shelter or shade, they should be protected from the effects of adverse weather conditions.

Article 7.5.4.

**Care of animals in lairages**

*Animals* in *lairages* should be cared for in accordance with the following recommendations:

1. As far as possible, established groups of *animals* should be kept together. Each *animal* should have enough space to stand up, lie down and turn around. *Animals* hostile to each other should be separated.

2. Where tethers, ties or individual stalls are used, they should allow *animals* to stand up and lie down without causing injury or distress.
3. Where bedding is provided, it should be maintained in a condition that minimises risks to the health and safety of the *animals*, and sufficient bedding should be used so that *animals* do not become soiled with manure.
4. *Animals* should be kept securely in the *lairage*, and care should be taken to prevent them from escaping and from predators.
5. Suitable drinking water should be available to the *animals* on their arrival and at all times to *animals* in *lairages* unless they are to be slaughtered without delay.
6. If *animals* are not to be slaughtered as soon as possible, suitable feed should be available to the *animals* on arrival and at intervals appropriate to the species. Unweaned *animals* should be slaughtered as soon as possible.
7. In order to prevent heat stress, *animals* subjected to high temperatures, particularly pigs and *poultry*, should be cooled by the use of water sprays, fans or other suitable means. However, the potential for water sprays to reduce the ability of *animals* to thermoregulate (especially *poultry*) should be considered in any decision to use water sprays. The risk of *animals* being exposed to very cold temperatures or sudden extreme temperature changes should also be considered.
8. The *lairage* area should be well lit in order to enable the *animals* to see clearly without being dazzled. During the night, the lights should be dimmed. Lighting should also be adequate to permit inspection of all *animals*. Subdued lighting, and for example blue light, may be useful in *poultry lairages* in helping to calm birds.
9. The condition and state of health of the *animals* in a *lairage* should be inspected at least every morning and evening by a *veterinarian* or, under the *veterinarian's* responsibility, by another competent person, such as an *animal handler*. *Animals* which are sick, weak, injured or showing visible signs of distress should be separated, and veterinary advice should be sought immediately regarding treatment or the *animals* should be humanely killed immediately if necessary.
10. Lactating dairy *animals* should be slaughtered as soon as possible. Dairy *animals* with obvious udder distension should be milked to minimise udder discomfort.
11. *Animals* which have given birth during the *journey* or in the *lairage* should be slaughtered as soon as possible or provided with conditions which are appropriate for suckling for their *welfare* and the *welfare* of the newborn. Under normal circumstances, *animals* which are expected to give birth during a *journey* should not be transported.
12. *Animals* with horns, antlers or tusks capable of injuring other *animals*, if aggressive, should be penned separately.
13. Poultry awaiting slaughter should be protected from adverse weather conditions and provided with adequate ventilation.
14. Lairage duration for poultry should be kept to the minimum and it should not exceed 12 hours.
15. Poultry in transport containers should be examined at the time of arrival. Containers should be stacked with sufficient gap between the columns so as to facilitate inspection of birds and movement of air through them.
16. Forced ventilation or other cooling systems may be necessary under certain conditions to avoid build up of temperature and humidity.

Annex E (contd)

Recommendations for specific species are described in detail in Articles 7.5.5. to 7.5.8.

## Article 7.5.5.

**Management of foetuses during slaughter of pregnant animals**

Under normal circumstances, pregnant *animals* that would be in the final 10% of their gestation period at the planned time of *unloading* at the *slaughterhouse* should be neither transported nor slaughtered. If such an event occurs, an *animal handler* should ensure that females are handled separately, and the specific procedures described below are applied. In all cases, the *welfare* of foetuses and dams during *slaughter* should be safeguarded.

Foetuses should not be removed from the uterus sooner than 5 minutes after the maternal neck or chest cut, to ensure absence of consciousness. A foetal heartbeat will usually still be present and foetal movements may occur at this stage, but these are only a cause for concern if the exposed foetus successfully breathes air.

If a live mature foetus is removed from the uterus, it should be prevented from inflating its lungs and breathing air (e.g. by clamping the trachea).

When uterine, placental or foetal tissues, including foetal blood, are not to be collected as part of the post-*slaughter* processing of pregnant *animals*, all foetuses should be left inside the unopened uterus until they are dead. When uterine, placental or foetal tissues are to be collected, where practical, foetuses should not be removed from the uterus until at least 15-20 minutes after the maternal neck or chest cut.

If there is any doubt about consciousness, the foetus should be killed with a captive bolt of appropriate size or a blow to the head with a suitable blunt instrument.

The above recommendations do not refer to foetal rescue. Foetal rescue, the practice of attempting to revive foetuses found alive at the evisceration of the dam, should not be attempted during normal commercial *slaughter* as it may lead to serious *welfare* complications in the newborn *animal*. These include impaired brain function resulting from oxygen shortage before rescue is completed, compromised breathing and body heat production because of foetal immaturity, and an increased incidence of infections due to a lack of colostrum.

## Article 7.5.6.

**Summary analysis of handling and restraining methods and the associated animal welfare issues**

	Presentation of animals	Specific procedure	Specific purpose	Animal welfare concerns/ implications	Key animal welfare requirements	Applicable species
No restraint	Animals are grouped	Group container	Gas stunning	Specific procedure is suitable only for gas stunning	Competent animal handlers in lairage; facilities; stocking density	Pigs, poultry
		In the field	Free bullet	Inaccurate targeting and inappropriate ballistics not achieving outright kill with first shot	Operator competence	Deer
		Group stunning pen	Head-only electrical Captive bolt	Uncontrolled movement of animals impedes use of hand operated electrical and mechanical stunning methods	Competent animal handlers in lairage and at stunning point	Pigs, sheep, goats, calves
	Individual animal confinement	Stunning pen/box	Electrical and mechanical stunning methods	Loading of animal; accuracy of stunning method, slippery floor and animal falling down	Competent animal handlers	Cattle, buffalo, sheep, goats, horses, pigs, deer, camelids, ratites

## Annex E (contd)

	Presentation of animals	Specific procedure	Specific purpose	Animal welfare concerns/ implications	Key animal welfare requirements	Applicable species
Restraining methods	Head restraint, upright	Halter/ head collar/bridle	Captive bolt Free bullet	Suitable for halter-trained animals; stress in untrained animals	Competent animal handlers	Cattle, buffalo, horses, camelids
	Head restraint, upright	Neck yoke	Captive bolt Electrical-head only Free bullet Slaughter without stunning	Stress of loading and neck capture; stress of prolonged restraint, horn configuration; unsuitable for fast line speeds, animals struggling and falling due to slippery floor, excessive pressure	Equipment; competent animal handlers, prompt stunning or slaughter	Cattle
	Leg restraint	Single leg tied in flexion (animal standing on 3 legs)	Captive bolt Free bullet	Ineffective control of animal movement, misdirected shots	Competent animal handler	Breeding pigs (boars and sows)
	Upright restraint	Beak holding	Captive bolt Electrical-head only	Stress of capture	Sufficient competent animal handlers	Ostriches
		Head restraint in electrical stunning box	Electrical-head only	Stress of capture and positioning	Competent animal handler	Ostriches
	Holding body upright- manual	Manual restraint	Captive bolt Electrical-head only Slaughter without stunning	Stress of capture and restraint; accuracy of stunning/ slaughter	Competent animal handlers	Sheep, goats, calves, raites, small camelids, poultry
	Holding body upright mechanical	Mechanical clamp / crush / squeeze/ V - restrainer (static)	Captive bolt Electrical methods Slaughter without stunning	Loading of animal and overriding; excessive pressure	Proper design and operation of equipment	Cattle, buffalo, sheep, goats, deer, pigs, ostriches
	Lateral restraint – manual or mechanical	Restrainer/ cradle/crush	Slaughter without stunning	Stress of restraint	Competent animal handlers	Sheep, goats, calves, camelids, cattle
	Upright restraint mechanical	Mechanical straddle (static)	Slaughter without stunning Electrical methods Captive bolt	Loading of animal and overriding	Competent animal handlers	Cattle, sheep, goats, pigs
	Upright restraint – manual or mechanical	Wing shackling	Electrical	Excessive tension applied prior to stunning	Competent animal handlers	Ostriches
Restraining and /or conveying methods	Mechanical - upright	V-restrainer	Electrical methods Captive bolt Slaughter without stunning	Loading of animal and overriding; excessive pressure, size mismatch between restrainer and animal	Proper design and operation of equipment	Cattle, calves, sheep, goats, pigs
	Mechanical- upright	Mechanical straddle – band restrainer (moving)	Electrical methods Captive bolt Slaughter without stunning	Loading of animal and overriding, size mismatch between restrainer and animal	Competent animal handlers, proper design and layout of restraint	Cattle, calves, sheep, goats, pigs
	Mechanical - upright	Flat bed/deck Tipped out of containers on to conveyors	Presentation of birds for shackling prior to electrical stunning Gas stunning	Stress and injury due to tipping in dump- module systems height of tipping conscious poultry broken bones and dislocations	Proper design and operation of equipment	Poultry

## Annex E (contd)

	Presentation of animals	Specific procedure	Specific purpose	Animal welfare concerns/ implications	Key animal welfare requirements	Applicable species
Restraining and/or conveying methods (contd)	Suspension and/or inversion	Poultry shackle	Electrical stunning Slaughter without stunning	Inversion stress; pain from compression on leg bones; Keep restraint as short as possible	Competent animal handlers; proper design and operation of equipment; birds should be hung by both legs	Poultry
	Suspension and/or inversion	Cone	Electrical – head-only Captive bolt Slaughter without stunning	Inversion stress	Competent animal handlers; proper design and operation of equipment	Poultry
	Upright restraint	Mechanical leg clamping	Electrical – head-only	Stress of resisting restraint in ostriches	Competent animal handlers; proper equipment design and operation	Ostriches
Restraining by inversion	Rotating box	Fixed side(s) (e.g. Weinberg pen)	Slaughter without stunning	Inversion stress; stress of resisting restraint, prolonged restraint, inhalation of blood and ingesta Keep restraint as brief as possible	Proper design and operation of equipment	Cattle
		Compressible side(s)	Slaughter without stunning	Inversion stress, stress of resisting restraint, prolonged restraint Preferable to rotating box with fixed sides Keep restraint as brief as possible	Proper design and operation of equipment	Cattle
Body restraint	Casting/hobbling	Manual	Mechanical stunning methods Slaughter without stunning	Stress of resisting restraint; animal temperament; bruising. Keep restraint as short as possible	Competent animal handlers	Sheep, goats, calves, small camelids, pigs
Leg restraints		Rope casting	Mechanical stunning methods Slaughter without stunning	Stress of resisting restraint; prolonged restraint, animal temperament; bruising Keep restraint as short as possible	Competent animal handlers	Cattle, camelids
		Tying of 3 or 4 legs	Mechanical stunning methods Slaughter without stunning	Stress of resisting restraint; prolonged restraint, animal temperament; bruising Keep restraint as short as possible	Competent animal handlers	Sheep, goats, small camelids, pigs

## Article 7.5.7.

**Stunning methods**1. General considerations

The competence of the operators, and the appropriateness, and effectiveness of the method used for *stunning* and the maintenance of the equipment are the responsibility of the management of the *slaughterhouse*, and should be checked regularly by a *Competent Authority*.

Persons carrying out *stunning* should be properly trained and competent, and should ensure that:

- a) the *animal* is adequately restrained;
- b) *animals* in *restraint* are stunned as soon as possible;
- c) the equipment used for *stunning* is maintained and operated properly in accordance with the manufacturer's recommendations, in particular with regard to the species and size of the *animal*;
- d) the ~~instrument~~ equipment is applied correctly;
- e) stunned *animals* are bled out (slaughtered) as soon as possible;
- f) *animals* are not stunned when *slaughter* is likely to be delayed; and
- g) backup *stunning* devices are available for immediate use if the primary method of *stunning* fails. Provision of a manual inspection area and simple intervention like neck dislocation for *poultry* would help prevent potential *welfare* problems.

In addition, such persons should be able to recognise when an *animal* is not correctly stunned and should take appropriate action.

## 2. Mechanical stunning

A mechanical device should be applied usually to the front of the head and perpendicular to the bone surface. The following diagrams illustrate the proper application of the device for certain species.

### Cattle

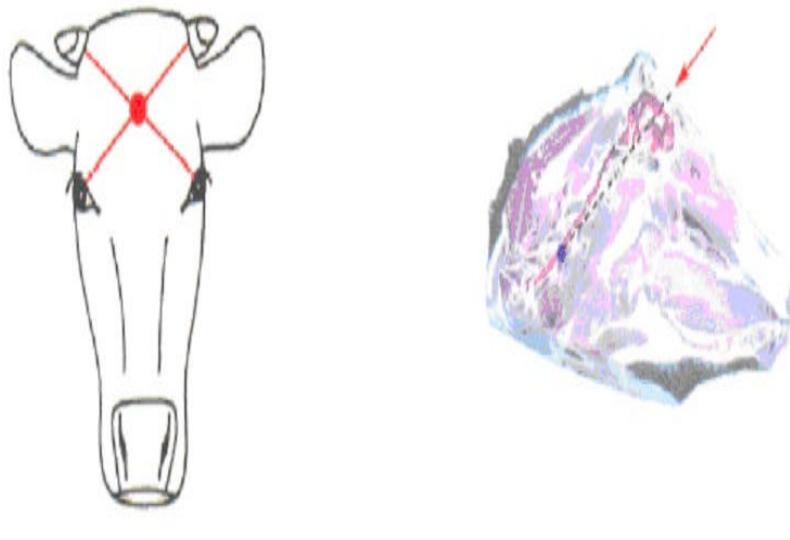


Figure source: Humane Slaughter Association (2005) Guidance Notes No. 3: Humane Killing of Livestock Using Firearms. Published by the Humane Slaughter Association, The Old School, Brewhouse Hill, Wheathampstead, Hertfordshire AL4 8AN, United Kingdom ([www.hsa.org.uk](http://www.hsa.org.uk)).

The optimum position for cattle is at the intersection of two imaginary lines drawn from the rear of the eyes to the opposite horn buds.

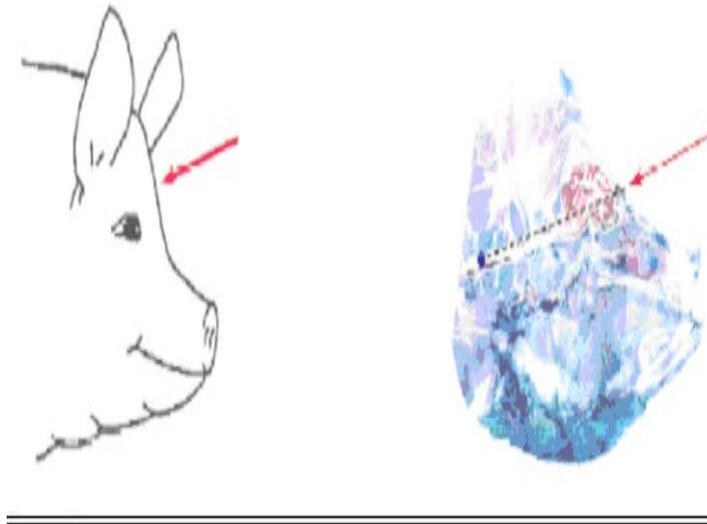
Annex E (contd)**Pigs**

Figure source: Humane Slaughter Association (2005) Guidance Notes No. 3: Humane Killing of Livestock Using Firearms. Published by the Humane Slaughter Association, The Old School, Brewhouse Hill, Wheathampstead, Hertfordshire AL4 8AN, United Kingdom ([www.hsa.org.uk](http://www.hsa.org.uk)).

The optimum position for pigs is on the midline just above eye level, with the shot directed down the line of the spinal cord.

**Sheep**

Figure source: Humane Slaughter Association (2005) Guidance Notes No. 3: Humane Killing of Livestock Using Firearms. Published by the Humane Slaughter Association, The Old School, Brewhouse Hill, Wheathampstead, Hertfordshire AL4 8AN, United Kingdom ([www.hsa.org.uk](http://www.hsa.org.uk)).

The optimum position for hornless sheep and goats is on the midline.

### Goats

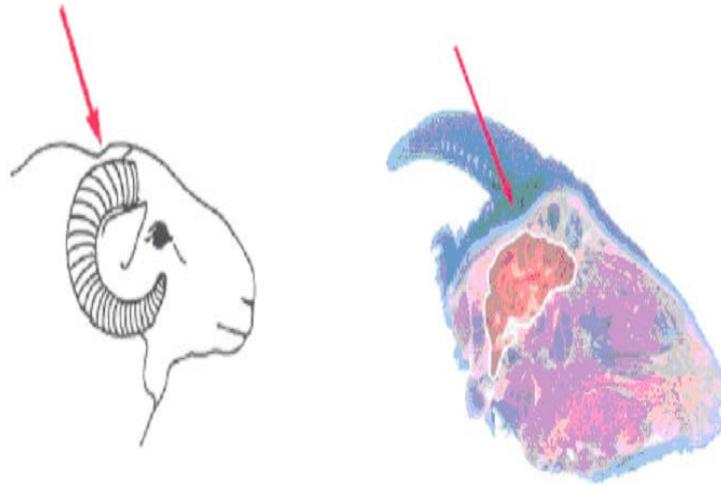


Figure Source: Humane Slaughter Association (2005) Guidance Notes No. 3: Humane Killing of Livestock Using Firearms. Published by the Humane Slaughter Association, The Old School, Brewhouse Hill, Wheathampstead, Hertfordshire AL4 8AN, United Kingdom ([www.hsa.org.uk](http://www.hsa.org.uk)).

The optimum position for heavily horned sheep and horned goats is behind the poll, aiming towards the angle of the jaw.

### Horses

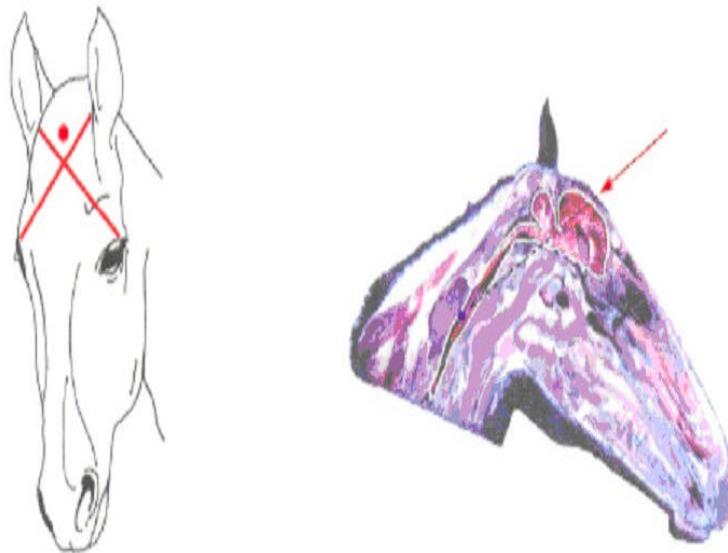


Figure Source: Humane Slaughter Association (2005) Guidance Notes No. 3: Humane Killing of Livestock Using Firearms. Published by the Humane Slaughter Association, The Old School, Brewhouse Hill, Wheathampstead, Hertfordshire AL4 8AN, United Kingdom ([www.hsa.org.uk](http://www.hsa.org.uk)).

The optimum position for horses is at right angles to the frontal surface, well above the point where imaginary lines from eyes to ears cross.

Annex E (contd)

Signs of correct *stunning* using a mechanical instrument are as follows:

- a) the *animal* collapses immediately and does not attempt to stand up;
- b) the body and muscles of the *animal* become tonic (rigid) immediately after the shot;
- c) normal rhythmic breathing stops; and
- d) the eyelid is open with the eyeball facing straight ahead and is not rotated.

**Poultry**

**Figure Source: Humane Slaughter Association (2005) Guidance Notes No. 3: Humane Killing of Livestock Using Firearms. Published by the Humane Slaughter Association, The Old School, Brewhouse Hill, Wheathampstead, Hertfordshire AL4 8AN, United Kingdom ([www.hsa.org.uk](http://www.hsa.org.uk)).**



Figure Source: Humane Slaughter Association (2005) Guidance Notes No. 3: Humane Killing of Livestock Using Firearms. Published by the Humane Slaughter Association, The Old School, Brewhouse Hill, Wheathampstead, Hertfordshire AL4 8AN, United Kingdom (www.hsa.org.uk).

Captive bolts powered by cartridges, compressed air or spring can be used for poultry. The optimum position for poultry species is at right angles to the frontal surface.

Firing of a captive bolt according to manufacturers' instruction should lead to immediate destruction of the skull and the brain and, as a result, immediate death.

### 3. Electrical stunning

#### a) General considerations

An electrical device should be applied to the *animal* in accordance with the following recommendations.

Electrodes should be designed, constructed, maintained and cleaned regularly to ensure that the flow of current is optimal and in accordance with manufacturing specifications. They should be placed so that they span the brain. The application of electrical currents which bypass the brain is unacceptable unless the *animal* has been stunned. The use of a single current leg-to-leg is unacceptable as a *stunning* method.

If, in addition, it is intended to cause cardiac arrest, the electrodes should either span the brain and immediately thereafter the heart, on the condition that it has been ascertained that the *animal* is adequately stunned, or span brain and heart simultaneously.

Electrical *stunning* equipment should not be applied on *animals* as a means of guidance, movement, *restraint* or immobilisation, and shall not deliver any shock to the *animal* before the actual *stunning* or *killing*.

## Annex E (contd)

Electrical *stunning* apparatus should be tested prior to application on *animals* using appropriate resistors or dummy loads to ensure the power output is adequate to stun *animals*.

The electrical *stunning* apparatus should incorporate a device that monitors and displays voltage (true RMS) and the applied current (true RMS) and that such devices are regularly calibrated at least annually.

Appropriate measures, such as removing excess wool or wetting the skin only at the point of contact, can be taken to minimise impedance of the skin and facilitate effective *stunning*.

The *stunning* apparatus required for electrical *stunning* should be provided with adequate power to achieve continuously the minimum current level recommended for *stunning* as indicated in the table below.

In all cases, the correct current level shall be attained within one second of the initiation of stun and maintained at least for between one and three seconds and in accordance with the manufacturer's instructions. **Minimum current levels for head-only *stunning* are show in the following table.**

Species	Minimum current levels for head-only stunning
Cattle	1.5 amps
Calves (bovines of less than 6 month of age)	1.0 amps
Pigs	1.25 amps
Sheep and goats	1.0 amps
Lambs	0.7 amps
Ostriches	0.4 amps

b) Electrical stunning of birds using a waterbath

There should be no sharp bends or steep gradients in the shackle line and the shackle line should be as short as possible consistent with achieving acceptable line speeds, and ensuring that birds have settled by the time they reach the water bath. A breast comforter can be used effectively to reduce wing flapping and calm birds. The angle at which the shackle line approaches the entrance to the water bath, and the design of the entrance to the water bath, and the draining of excess 'live' water from the bath are all important considerations in ensuring birds are calm as they enter the bath, do not flap their wings, and do not receive pre-stun electric shocks.

In the case of birds suspended on a moving line, measures should be taken to ensure that the birds are not wing flapping at the entrance of the stunner. The birds should be secure in their shackle, but there should not be undue pressure on their shanks. **The shackle size should be appropriate to fit the size of the shanks (Meta tarsal bones) of birds.**

**Birds should be hung on shackles by both legs.**

**Birds with dislocated or broken legs and wings should not be shackled, instead humanely killed**

**The duration between hanging on shackles and *stunning* should be kept to the minimum. In any event, the time between shackling and *stunning* should not exceed one minute.**

Waterbaths for *poultry* should be adequate in size and depth for the type of bird being slaughtered, and their height should be adjustable to allow for the head of each bird to be immersed. The electrode immersed in the bath should extend the full length of the waterbath. Birds should be immersed in the bath up to the base of their wings.

The waterbath should be designed and maintained in such a way that when the shackles pass over the water, they are in continuous contact with the earthed rubbing bar.

The control box for the waterbath stunner should incorporate an ammeter which displays the total current flowing through the birds.

The shackle-to-leg contact should be wetted preferably before the birds are inserted in the shackles. In order to improve electrical conductivity of the **soft** water, it is recommended that salt be added in the waterbath as necessary. Additional salt should be added regularly as a solution to maintain suitable constant concentrations in the waterbath.

Using waterbaths, birds are stunned in groups and different birds will have different impedances. The voltage should be adjusted so that the total current is the required current per bird as shown in the table hereafter, multiplied by the number of birds in the waterbath at the same time. The following values have been found to be satisfactory when employing a 50 Hertz sinusoidal alternating current.

Birds should receive the current for at least 4 seconds.

While a lower current may also be satisfactory, the current shall in any case be such as to ensure that unconsciousness occurs immediately and lasts until the bird has been killed by cardiac arrest or by bleeding. When higher electrical frequencies are used, higher currents may be required.

Every effort shall be made to ensure that no conscious or live birds enter the scalding tank.

In the case of automatic systems, until fail-safe systems of *stunning* and bleeding have been introduced, a manual back-up system should be in place to ensure that any birds which have missed the waterbath stunner and/or the automatic neck-cutter are immediately stunned and/or killed immediately, and they are dead before entering scald tank.

To lessen the number of birds that have not been effectively stunned reaching neck cutters, steps should be taken to ensure that small birds do not go on the line amongst bigger birds and that these small birds are stunned separately. **Height of the waterbath stunner should be adjusted according to the size of birds being stunned and slaughtered to ensure even the small birds are immersed in the water bath up to the base of the wings.**

**Minimum currents for stunning poultry when using 50Hz**

<b>Species</b>	<b>Minimum current (milliamperes per bird)</b>
Broilers	100
Layers (spent hens)	100
Turkeys	150
Ducks and geese	130

## Annex E (contd)

**Minimum currents for stunning poultry when using high frequencies**

Frequency (Hz)	Minimum currents (milliamperes per bird)	
	Chickens	Turkeys
< 200 Hz	100 mA	250 mA
From 200 to 400 Hz	150 mA	400 mA
From 400 to 1500 Hz	200 mA	400 mA

**High frequency electrical stunning seldom induces cardiac arrest, and so it is potentially suitable as an alternative to slaughter without stunning.**

4. Gas stunning (under study)a) Stunning of pigs by exposure to carbon dioxide (CO<sub>2</sub>)

The concentration of CO<sub>2</sub> for *stunning* should be preferably 90% by volume but in any case no less than 80% by volume. After entering the *stunning* chamber, the *animals* should be conveyed to the point of maximum concentration of the gas as rapidly as possible and be kept until they are dead or brought into a state of insensibility which lasts until *death* occur due to bleeding. Ideally, pigs should be exposed to this concentration of CO<sub>2</sub> for 3 minutes. Sticking should occur as soon as possible after exit from the gas chamber.

In any case, the concentration of the gas should be such that it minimises as far as possible all stress of the *animal* prior to loss of consciousness.

The chamber in which *animals* are exposed to CO<sub>2</sub> and the equipment used for conveying them through it shall be designed, constructed and maintained in such a way as to avoid injury or unnecessary stress to the *animals*. The animal density within the chamber should be such to avoid stacking *animals* on top of each others.

The conveyor and the chamber shall be adequately lit to allow the *animals* to see their surroundings and, if possible, each other.

It should be possible to inspect the CO<sub>2</sub> chamber whilst it is in use, and to have access to the *animals* in emergency cases.

The chamber shall be equipped to continuously measure and display register at the point of *stunning* the CO<sub>2</sub> concentration and the time of exposure, and to give a clearly visible and audible warning if the concentration of CO<sub>2</sub> falls below the required level.

Emergency *stunning* equipment should be available at the point of exit from the *stunning* chamber and used on any pigs that do not appear to be dead or completely stunned.

## b) Inert gas mixtures for stunning pigs

Inhalation of high concentration of carbon dioxide is aversive and can be distressing to *animals*. Therefore, the use of non-aversive gas mixtures is being developed.

Such gas mixtures include:

- i) a maximum of 2% by volume of oxygen in argon, nitrogen or other inert gases, or
- ii) to a maximum of 30% by volume of carbon dioxide and a maximum of 2% by volume of oxygen in mixtures with carbon dioxide and argon, nitrogen or other inert gases.

Exposure time to the gas mixtures should be sufficient to ensure that no pigs regain consciousness before *death* supervenes through bleeding or cardiac arrest is induced.

c) Gas stunning of poultry

The main objective of gas *stunning* is to avoid the pain and suffering associated with shackling conscious *poultry* under water bath *stunning* and *killing* systems. Therefore, gas *stunning* should be limited to birds contained in crates or on conveyors only. Inhalation of high concentrations (40% or more) of carbon dioxide can be aversive to birds and ideally the gas mixture should be non-aversive to *poultry*.

Live *poultry* contained within transport modules or crates may be exposed to gradually increasing concentrations of CO<sub>2</sub> until the birds are properly stunned. No bird should recover consciousness or sensibility during bleeding.

Gas *stunning* of *poultry* in their transport *containers* will eliminate the need for live birds' handling at the processing plant and all the problems associated with the electrical *stunning*. Gas *stunning* of *poultry* on a conveyor eliminates the problems associated with the electrical water bath *stunning*.

Live *poultry* should be conveyed into the gas mixtures either in transport crates or on conveyor belts.

The following gas procedures have been properly documented for chickens and turkeys but do not necessarily apply for other domestic birds. In any case the procedure should be designed as to ensure that all *animals* are properly stunned without unnecessary suffering. Some monitoring points for gas *stunning* could be the following:

- ensure smooth entry and passage of crates or birds through the system
- avoid bunching of birds in crates or conveyors
- gas concentrations should be continuously monitored and maintained during operation
- provide visible and audible alarm systems if gas concentrations are inappropriate to the species
- calibrate of gas monitors and maintain verifiable records
- duration of exposure should be adequate to prevent recovery of consciousness in birds
- provision to monitor and deal with recovery of consciousness
- blood vessels cut should induce *death* in unconscious birds
- all birds should be dead before entering scalding tank
- emergency procedures in the event of system failure.

i) Gas mixtures used for stunning poultry could include:

- a minimum of 2 minutes exposure to 40% carbon dioxide, 30% oxygen and 30% nitrogen, followed by a minimum of one minute exposure to 80% carbon dioxide in air; or

Annex E (contd)

- a minimum of 2 minutes exposure to any mixture of argon, nitrogen or other inert gases with atmospheric air and carbon dioxide, provided that the carbon dioxide concentration does not exceed 30% by volume and the residual oxygen concentration does not exceed 2% by volume; or
  - a minimum of 2 minutes exposure to argon, nitrogen, other inert gases or any mixture of these gases in atmospheric air with a maximum of 2% residual oxygen by volume; or
  - a minimum of 2 minutes exposure to a minimum of 55% carbon dioxide in air; or
  - a minimum of one minute exposure to 30% carbon dioxide in air, followed by a minimum of one minute exposure to at least 60% carbon dioxide in air
- ii) Requirements for effective use are as follows:
- Compressed gases should be vaporised prior to administration into the chamber and should be at room temperature to prevent any thermal shock; under no circumstances, should solid gases with freezing temperatures enter the chamber.
  - Gas mixtures should be humidified.
  - Appropriate gas concentrations of oxygen and carbon dioxide should be monitored and displayed continuously at the level of the birds inside the chamber to ensure that anoxia ensues.

Under no circumstances, should birds exposed to gas mixtures be allowed to regain consciousness. If necessary, the exposure time should be extended.

5. Bleeding

From the point of view of *animal welfare*, *animals* which are stunned with a reversible method should be bled without delay. Maximum stun-stick interval depends on the parameters of the *stunning* method applied, the species concerned and the bleeding method used (full cut or chest stick when possible). As a consequence, depending on those factors, the *slaughterhouse* operator should set up a maximum stun-stick interval that ensures that no *animals* recover consciousness during bleeding. In any case the following time limits should be applied.

All *animals* should be bled out by incising both carotid arteries, or the vessels from which they arise (e.g. chest stick). However, when the *stunning* method used causes cardiac arrest, the incision of all of these vessels is not necessary from the point of view of *animal welfare*.

It should be possible for staff to observe, inspect and access the *animals* throughout the bleeding period. Any *animal* showing signs of recovering consciousness should be re-stunned.

After incision of the blood vessels, no scalding carcass treatment or dressing procedures should be performed on the *animals* for at least 30 seconds, or in any case until all brain-stem reflexes have ceased.

Stunning method	Maximum delay for bleeding to be started
Electrical methods and non-penetrating captive bolt	20 seconds
CO <sub>2</sub>	60 seconds (after leaving the chamber)

## Article 7.5.8.

**Summary analysis of stunning methods and the associated animal welfare issues**

Method	Specific method	Animal welfare concerns/ implications	Key animal welfare requirements applicable	Species	Comment
Mechanical	Free bullet	Inaccurate targeting and inappropriate ballistics	Operator competence; achieving outright kill with first shot	Cattle, calves, buffalo, deer, horses, pigs (boars and sows)	Personnel safety
	Captive bolt - penetrating	Inaccurate targeting, velocity and diameter of bolt	Competent operation and maintenance of equipment; restraint; accuracy	Cattle, calves, buffalo, sheep, goats, deer, horses, pigs, camelids, ratites, poultry	(Unsuitable for specimen collection from TSE suspects). A back-up gun should be available in the event of an ineffective shot
	Captive bolt - non-penetrating	Inaccurate targeting, velocity of bolt, potentially higher failure rate than penetrating captive bolt	Competent operation and maintenance of equipment; restraint; accuracy	Cattle, calves, sheep, goats, deer, pigs, camelids, ratites, poultry	Presently available devices are not recommended for young bulls and animals with thick skull. This method should only be used for cattle and sheep when alternative methods are not available.
	Manual percussive blow	Inaccurate targeting; insufficient power; size of instrument	Competent animal handlers; restraint; accuracy. Not recommended for general use	Young and small mammals, ostriches and poultry	Mechanical devices potentially more reliable. Where manual percussive blow is used, unconsciousness should be achieved with single sharp blow delivered to central skull bones
Electrical	Split application: 1. across head then head to chest; 2. across head then across chest	Accidental pre-stun electric shocks; electrode positioning; application of a current to the body while animal conscious; inadequate current and voltage	Competent operation and maintenance of equipment; restraint; accuracy	Cattle, calves, sheep, goats and pigs, ratites and poultry	Systems involving repeated application of head-only or head-to-leg with short current durations (<1 second) in the first application should not be used.
	Single application: 1. head only; 2. head to body; 3. head to leg	Accidental pre-stun electric shocks; inadequate current and voltage; wrong electrode positioning; recovery of consciousness	Competent operation and maintenance of equipment; restraint; accuracy	Cattle, calves, sheep, goats, pigs, ratites, poultry	
	Waterbath	Restraint, accidental pre-stun electric shocks; inadequate current and voltage; recovery of consciousness	Competent operation and maintenance of equipment	Poultry only	
Gaseous	CO <sub>2</sub> air/O <sub>2</sub> mixture; CO <sub>2</sub> inert gas mixture	Aversiveness of high CO <sub>2</sub> ; respiratory distress; inadequate exposure	Concentration; duration of exposure; design, maintenance and operation of equipment; stocking density management	Pigs, poultry	
	Inert gases	Recovery of consciousness	Concentration; duration of exposure; design, maintenance and operation of equipment; stocking density management	Pigs, poultry	

## Annex E (contd)

## Article 7.5.9.

**Summary analysis of slaughter methods and the associated animal welfare issues**

Slaughter methods	Specific method	Animal welfare concerns/ implications	Key requirements	Species	Comments
Bleeding out by severance of blood vessels in the neck without stunning	Full frontal cutting across the throat	Failure to cut both common carotid arteries; occlusion of cut arteries; pain during and after the cut	High level of operator competency. A very sharp blade or knife of sufficient length so that the point of the knife remains outside the incision during the cut; the point of the knife should not be used to make the incision. The incision should not close over the knife during the throat cut.	Cattle, buffalo, horses, camelids, sheep, goats, poultry, ratites	No further procedure should be carried out before the bleeding out is completed (i.e. at least 30 seconds for mammals). The practice to remove hypothetical blood clots just after the bleeding should be discouraged since this may increase animal suffering.
Bleeding with prior stunning	Full frontal cutting across the throat	Failure to cut both common carotid arteries; occlusion of cut arteries; pain during and after the cut.	A very sharp blade or knife of sufficient length so that the point of the knife remains outside the incision during the cut; the point of the knife should not be used to make the incision. The incision should not close over the knife during the throat cut.	Cattle, buffalo, horses, camelids, sheep, goats	
	Neck stab followed by forward cut	Ineffective stunning; failure to cut both common carotid arteries; impaired blood flow; delay in cutting after reversible stunning	Prompt and accurate cutting	Camelids, sheep, goats, poultry, ratites	
	Neck stab alone	Ineffective stunning; failure to cut both common carotid arteries; impaired blood flow; delay in cutting after reversible stunning	Prompt and accurate cutting	Camelids, sheep, goats, poultry, ratites	
	Chest stick into major arteries or hollow-tube knife into heart	Ineffective stunning; inadequate size of stick wound; inadequate length of sticking knife; delay in sticking after reversible stunning	Prompt and accurate sticking	Cattle, sheep, goats, pigs	
	Neck skin cut followed by severance of vessels in the neck	Ineffective stunning; inadequate size of stick wound; inadequate length of sticking knife; delay in sticking after reversible stunning	Prompt and accurate cutting of vessels	Cattle	
	Automated mechanical cutting	Ineffective stunning; failure to cut and misplaced cuts. Recovery of consciousness following reversible stunning systems	Design, maintenance and operation of equipment; accuracy of cut; manual back-up	Poultry only	
	Manual neck cut on one side	Ineffective stunning; recovery of consciousness following reversible stunning systems	Prior non-reversible stunning	Poultry only	N.B. slow induction of unconsciousness under slaughter without stunning

Slaughter methods	Specific method	Animal welfare concerns/ implications	Key requirements	Species	Comments
Bleeding with prior stunning (contd)	Oral cut	Ineffective stunning; recovery of consciousness following reversible stunning systems	Prior non-reversible stunning	Poultry only	N.B. slow induction of unconsciousness in non-stun systems
Other methods without stunning	Decapitation with a sharp knife	Pain due to loss of consciousness not being immediate		Sheep, goats, poultry	This method is only applicable to Jhatka slaughter
	Manual neck dislocation and decapitation	Pain due to loss of consciousness not being immediate; difficult to achieve in large birds	Neck dislocation should be performed in one stretch to sever the spinal cord	Poultry only	Slaughter by neck dislocation should be performed in one stretch to sever the spinal cord. Acceptable only when slaughtering small numbers of small birds.
Cardiac arrest in a waterbath electric stunner	Bleeding by evisceration		Induction of cardiac arrest	Quail	
	Bleeding by neck cutting			Poultry	

Article 7.5.10.

### Methods, procedures or practices unacceptable on animal welfare grounds

1. The restraining methods which work through immobilisation by injury such as breaking legs, leg tendon cutting, and severing the spinal cord (e.g. using a puntilla or dagger) cause severe pain and stress in *animals*. Those methods are not acceptable in any species.
2. The use of the electrical *stunning* method with a single application leg to leg is ineffective and unacceptable in any species.
3. The *slaughter* method of brain stem severance by piercing through the eye socket or skull bone without prior *stunning* is not acceptable in any species.

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## CHAPTER 7.6.

## KILLING OF ANIMALS FOR DISEASE CONTROL PURPOSES

## Article 7.6.1.

### General principles

These recommendations are based on the premise that a decision to kill the *animals* has been made, and address the need to ensure the *welfare* of the *animals* until they are dead.

1. All personnel involved in the humane *killing* of *animals* should have the relevant skills and competencies. Competence may be gained through formal training and/or practical experience.
2. As necessary, operational procedures should be adapted to the specific circumstances operating on the premises and should address, apart from *animal welfare*, aesthetics of the method of euthanasia, cost of the method, operator safety, biosecurity and environmental aspects, aesthetics of the method of euthanasia and cost of the method.
3. Following the decision to kill the *animals*, *killing* should be carried out as quickly as possible, and normal husbandry should be maintained until the *animals* are killed.
4. The handling and movement of *animals* should be minimised and when done, it should be done in accordance with the recommendations described below.
5. *Animal restraint* should be sufficient to facilitate effective *killing*, and in accordance with *animal welfare* and operator safety requirements; when *restraint* is required, *killing* should follow with minimal delay.
6. When *animals* are killed for disease control purposes, methods used should result in immediate *death* or immediate loss of consciousness lasting until *death*; when loss of consciousness is not immediate, induction of unconsciousness should be non-aversive and should not cause anxiety, pain, distress or suffering in *animals*.
7. For *animal welfare* considerations, young *animals* should be killed before older *animals*; for biosecurity considerations, infected *animals* should be killed first, followed by in-contact *animals*, and then the remaining *animals*.
8. There should be continuous monitoring of the procedures by the *Competent Authorities* to ensure they are consistently effective with regard to *animal welfare*, operator safety and biosecurity.
9. When the operational procedures are concluded, there should be a written report describing the practices adopted and their effect on *animal welfare*, operator safety and biosecurity.
10. These general principles should also apply when *animals* need to be killed for other purposes such as after natural disasters or for culling animal populations.

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## Article 7.6.2.

**Organisational structure**

Disease control contingency plans should be in place at a national level and should contain details of management structure, disease control strategies and operational procedures; *animal welfare* considerations should be addressed within these disease control contingency plans. The plans should also include a strategy to ensure that an adequate number of personnel competent in the humane *killing* of *animals* is available. Local level plans should be based on national plans and be informed by local knowledge.

Disease control contingency plans should address the *animal welfare* issues that may result from animal movement controls.

The operational activities should be led by an *official Veterinarian* who has the authority to appoint the personnel in the specialist teams and ensure that they adhere to the required *animal welfare* and biosecurity standards. When appointing the personnel, he/she should ensure that the personnel involved have the required competencies.

The *official Veterinarian* should be responsible for all activities across one or more affected premises and should be supported by coordinators for planning (including communications), operations and logistics to facilitate efficient operations.

The *official Veterinarian* should provide overall guidance to personnel and logistic support for operations on all affected premises to ensure consistency in adherence to the OIE *animal welfare* and animal health recommendations.

A specialist team, led by a team leader answerable to the *official Veterinarian*, should be deployed to work on each affected premises. The team should consist of personnel with the competencies to conduct all required operations; in some situations, personnel may be required to fulfil more than one function. Each team should contain a *veterinarian* or have access to veterinary advice at all times.

In considering the *animal welfare* issues associated with *killing animals*, the key personnel, their responsibilities and competencies required are described in Article 7.6.3.

## Article 7.6.3.

**Responsibilities and competencies of the specialist team**1. Team leader

## a) Responsibilities

- i) plan overall operations on affected premises;
- ii) determine and address requirements for *animal welfare*, operator safety and biosecurity;
- iii) organise, brief and manage team of people to facilitate humane *killing* of the relevant *animals* on the premises in accordance with national regulations and these recommendations;
- iv) determine logistics required;

- v) monitor operations to ensure *animal welfare*, operator safety and biosecurity requirements are met;
- vi) report upwards on progress and problems;
- vii) provide a written report at the conclusion of the *killing*, describing the practices adopted and their effect on the *animal welfare*, operator safety and biosecurity outcomes.

b) Competencies

- i) appreciation of normal animal husbandry practices;
- ii) appreciation of *animal welfare* and the underpinning behavioural, anatomical and physiological processes involved in the *killing* process;
- iii) skills to manage all activities on premises and deliver outcomes on time;
- iv) awareness of psychological effects on farmer, team members and general public;
- v) effective communication skills;
- vi) appreciation of the environmental impacts caused by their operation.

2. Veterinarian

a) Responsibilities

- i) determine and supervise the implementation of the most appropriate *killing* method to ensure that *animals* are killed without avoidable pain and distress;
- ii) determine and implement the additional requirements for *animal welfare*, including the order of *killing*;
- iii) ensure that confirmation of the *death* of the *animals* is carried out by competent persons at appropriate times after the *killing* procedure;
- iv) minimise the risk of disease spread within and from the premises through the supervision of biosecurity procedures;
- v) continuously monitor *animal welfare* and biosecurity procedures;
- vi) in cooperation with the leader, prepare a written report at the conclusion of the *killing*, describing the practices adopted and their effect on *animal welfare*.

b) Competencies

- i) ability to assess *animal welfare*, especially the effectiveness of *stunning* and *killing* and to correct any deficiencies;
- ii) ability to assess biosecurity risks.

Annex E (contd)3. Animal handlers

## a) Responsibilities

- i) review on-site facilities in terms of their appropriateness;
- ii) design and construct temporary animal handling facilities, when required;
- iii) move and restrain *animals*;
- iv) continuously monitor *animal welfare* and biosecurity procedures.

## b) Competencies

- i) animal handling in emergency situations and in close confinement is required;
- ii) an appreciation of biosecurity and containment principles.

4. Animal killing personnel

## a) Responsibilities

Humane *killing* of the *animals* through effective *stunning* and *killing* should be ensured.

## b) Competencies

- i) when required by regulations, licensed to use necessary equipment;
- ii) competent to use and maintain relevant equipment;
- iii) competent to use techniques for the species involved;
- iv) competent to assess effective *stunning* and *killing*.

5. Carcass disposal personnel

## a) Responsibilities

An efficient carcass disposal (to ensure *killing* operations are not hindered) should be ensured.

## b) Competencies

The personnel should be competent to use and maintain available equipment and apply techniques for the species involved.

6. Farmer/owner/manager

## a) Responsibilities

- i) assist when requested.

## b) Competencies

- i) specific knowledge of his/her *animals* and their environment.

## Article 7.6.4.

**Considerations in planning the humane killing of animals**

Many activities will need to be conducted on affected premises, including the humane *killing* of *animals*. The team leader should develop a plan for humanely *killing animals* on the premises which should include consideration of:

1. minimising handling and movement of *animals*;
2. *killing* the *animals* on the affected premises; however, there may be circumstances where the *animals* may need to be moved to another location for *killing*; when the *killing* is conducted at an *abattoir*, the recommendations in Chapter 7.5. on the *slaughter* of *animals* should be followed;
3. the species, number, age and size of *animals* to be killed, and the order of *killing* them;
4. methods of *killing* the *animals*, and their cost;
5. housing, husbandry, location of the *animals* as well as accessibility of the farm;
6. the availability and effectiveness of equipment needed for *killing* of the *animals*, as well as the time necessary to kill the required number of *animals* using such methods;
7. the facilities available on the premises that will assist with the *killing* including any additional facilities that may need to be brought on and then removed from the premises;
8. biosecurity and environmental issues;
9. the health and safety of personnel conducting the *killing*;
10. any legal issues that may be involved, for example where restricted veterinary drugs or poisons may be used, or where the process may impact on the environment;
11. the presence of other nearby premises holding *animals*;
12. possibilities for removal, disposal and destruction of carcasses.

The plan should minimise the negative *welfare* impacts of the *killing* by taking into account the different phases of the procedures to be applied for *killing* (choice of the *killing* sites, *killing* methods, etc.) and the measures restricting the movements of the *animals*.

Competences and skills of the personnel handling and *killing animals*.

In designing a *killing* plan, it is essential that the method chosen be consistently reliable to ensure that all *animals* are humanely and quickly killed.

## Annex E (contd)

## Article 7.6.5.

**Table summarising killing methods described in Articles 7.6.6-7.6.18.**

The methods are described in the order of mechanical, electrical and gaseous, not in an order of desirability from an *animal welfare* viewpoint.

Species	Age range	Procedure	Restraint necessary	Animal welfare concerns with inappropriate application	Article reference
Cattle	all	free bullet	no	non-lethal wounding	7.6.6.
	all except neonates	penetrating captive bolt - followed by pithing or bleeding	yes	ineffective stunning	7.6.7.
	adults only	non-penetrating captive bolt, followed by bleeding	yes	ineffective stunning, regaining of consciousness before killing	7.6.8.
	calves only	electrical, two-stage application	yes	pain associated with cardiac arrest after ineffective stunning	7.6.10.
	calves only	electrical, single application (method 1)	yes	ineffective stunning	7.6.11.
	all	injection with barbiturates and other drugs	yes	non-lethal dose, pain associated with injection site	7.6.15.
Sheep and goats	all	free bullet	no	non-lethal wounding	7.6.6.
	all except neonates	penetrating captive bolt, followed by pithing or bleeding	yes	ineffective stunning, regaining of consciousness before death	7.6.7.
	all except neonates	non-penetrating captive bolt, followed by bleeding	yes	ineffective stunning, regaining of consciousness before death	7.6.8.
	neonates	non-penetrating captive bolt	yes	non-lethal wounding	7.6.8.
	all	electrical, two-stage application	yes	pain associated with cardiac arrest after ineffective stunning	7.6.10.
	all	electrical, single application (method 1)	yes	ineffective stunning	7.6.11.
	neonates only	CO <sub>2</sub> / air mixture	yes	slow induction of unconsciousness, aversiveness of induction	7.6.12.
	neonates only	nitrogen and/or inert gas mixed with CO <sub>2</sub>	yes	slow induction of unconsciousness, aversiveness of induction	7.6.13.
	neonates only	nitrogen and/or inert gases	yes	slow induction of unconsciousness	7.6.14.
	all	injection of barbiturates and other drugs	yes	non-lethal dose, pain associated with injection site	7.6.15.
Pigs	all, except neonates	free bullet	no	non-lethal wounding	7.6.6.
	all except neonates	penetrating captive bolt, followed by pithing or bleeding	yes	ineffective stunning, regaining of consciousness before death	7.6.7.
	neonates only	non-penetrating captive bolt	yes	non-lethal wounding	7.6.8.
	all	electrical, two-stage application	yes	pain associated with cardiac arrest after ineffective stunning	7.6.10.
	all	electrical, single application (method 1)	yes	ineffective stunning	7.6.11.
	neonates only	CO <sub>2</sub> / air mixture	yes	slow induction of unconsciousness, aversiveness of induction	7.6.12.
	neonates only	nitrogen and/or inert gas mixed with CO <sub>2</sub>	yes	slow induction of unconsciousness, aversiveness of induction	7.6.13.
	neonates only	nitrogen and/or inert gases	yes	slow induction of unconsciousness	7.6.14.
	all	injection with barbiturates and other	yes	non-lethal dose, pain associated with injection site	7.6.15.
Poultry	adults only	non-penetrating captive bolt	yes	ineffective stunning	7.6.8.

## Annex E (contd)

Species	Age range	Procedure	Restraint necessary	Animal welfare concerns with inappropriate application	Article reference
Poultry (contd)	day-olds and eggs only	maceration	no	non-lethal wounding, non- immediacy	7.6.9.
	adults only	electrical, single application (method 2)	yes	ineffective stunning	7.6.11.
	adults only	electrical, single application, followed by killing (method 3)	yes	ineffective stunning; regaining of consciousness before death	7.6.11.
	all	CO <sub>2</sub> / air mixture Method 1 Method 2	yes no	slow induction of unconsciousness, aversiveness of induction	7.6.12.
	all	nitrogen and/or inert gas mixed with CO <sub>2</sub>	yes	slow induction of unconsciousness, aversiveness of induction	7.6.13.
	all	nitrogen and/or inert gases	yes	slow induction of unconsciousness	7.6.14.
	all	injection of barbiturates and other drugs	yes	non-lethal dose, pain associated with injection site	7.6.15.
	adults only	addition of anaesthetics to feed or water, followed by an appropriate killing method	no	ineffective or slow induction of unconsciousness	7.6.16.

## Article 7.6.6.

**Free bullet**1. Introduction

- a) A free bullet is a projectile fired from a shotgun, rifle, handgun or purpose-made humane killer.
- b) The most commonly used firearms for close range use are:
  - i) humane killers (specially manufactured/adapted single-shot weapons);
  - ii) shotguns (12, 16, 20, 28 bore and .410);
  - iii) rifles (.22 rimfire);
  - iv) handguns (various calibres from .32 to .45).
- c) The most commonly used firearms for long range use are rifles (.22, .243, .270 and .308).
- d) A free bullet used from long range should be aimed to penetrate the skull or soft tissue at the top of the neck of the *animals* (high neck shot) and to cause irreversible concussion and *death* and should only be used by properly trained and competent marksmen.

2. Requirements for effective use

- a) The marksman should take account of human safety in the area in which he/she is operating. Appropriate vision and hearing protective devices should be worn by all personnel involved.
- b) The marksman should ensure that the *animal* is not moving and in the correct position to enable accurate targeting and the range should be as short as possible (5 –50 cm for a shotgun) but the barrel should not be in contact with the head of the *animals*.
- c) The correct cartridge, calibre and type of bullet for the different species age and size should be used. Ideally, the ammunition should expand upon impact and dissipate its energy within the cranium.
- d) Shot *animals* should be checked to ensure the absence of brain stem reflexes.

Annex E (contd)3. Advantages

- a) Used properly, a free bullet provides a quick and effective method for *killing*.
- b) It requires minimal or no *restraint* and can be use to kill from a distance by properly trained and competent marksmen.
- c) It is suitable for *killing* agitated *animals* in open spaces.

4. Disadvantages

- a) The method is potentially dangerous to humans and other *animals* in the area.
- b) It has the potential for non-lethal wounding.
- c) Destruction of brain tissue may preclude diagnosis of some *diseases*.
- d) Leakage of bodily fluids may present a biosecurity risk.
- e) Legal requirements may preclude or restrict use.
- f) There is a limited availability of competent personnel.

5. Conclusion

The method is suitable for cattle, sheep, goats and pigs, including large *animals* in open spaces.

**Figure 1.** The optimum shooting position for cattle is at the intersection of two imaginary lines drawn from the rear of the eyes to the opposite horn buds.

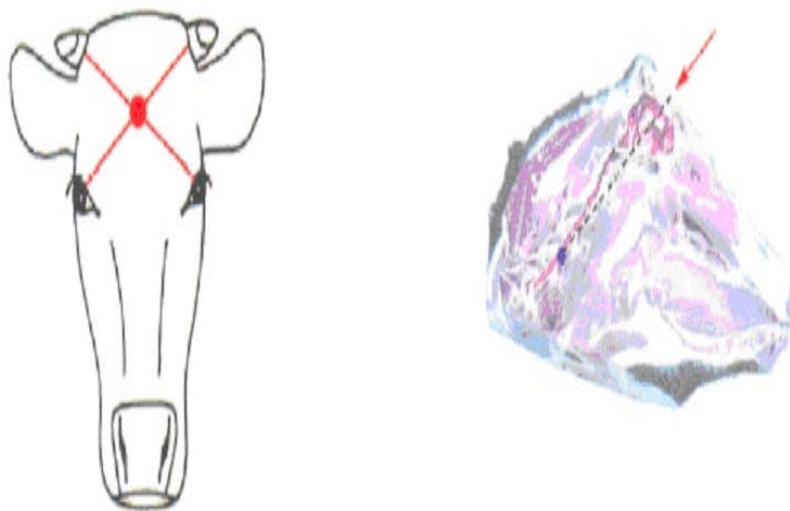


Figure source: Humane Slaughter Association (2005) Guidance Notes No. 3: Humane Killing of Livestock Using Firearms. Published by the Humane Slaughter Association, The Old School, Brewhouse Hill, Wheathampstead, Hertfordshire AL4 8AN, United Kingdom ([www.hsa.org.uk](http://www.hsa.org.uk)).

**Figure 2.** The optimum position for hornless sheep and goats is on the midline.

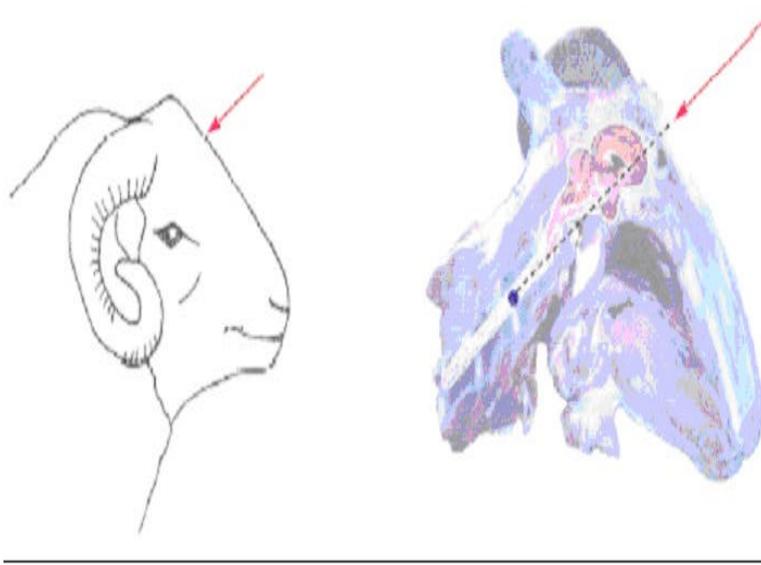


Figure source: Humane Slaughter Association (2005) Guidance Notes No. 3: Humane Killing of Livestock Using Firearms. Published by the Humane Slaughter Association, The Old School, Brewhouse Hill, Wheathampstead, Hertfordshire AL4 8AN, United Kingdom ([www.hsa.org.uk](http://www.hsa.org.uk)).

**Figure 3.** The optimum shooting position for heavily horned sheep and horned goats is behind the poll aiming towards the angle of the jaw.

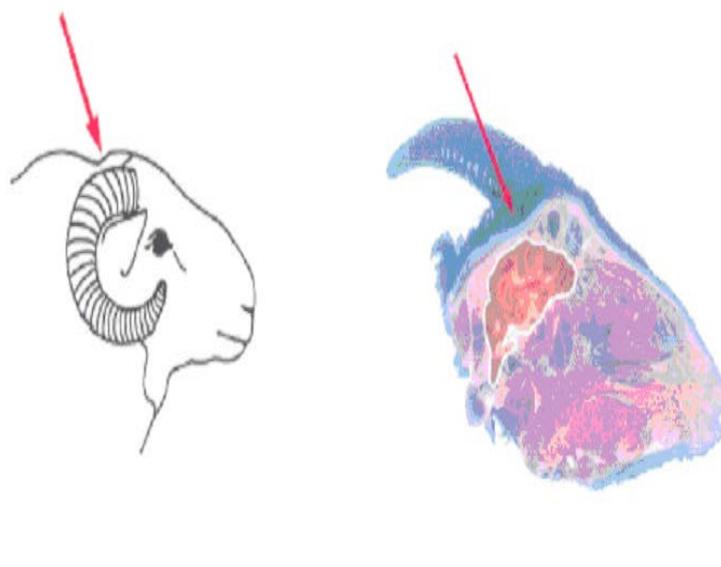


Figure Source: Humane Slaughter Association (2005) Guidance Notes No. 3: Humane Killing of Livestock Using Firearms. Published by the Humane Slaughter Association, The Old School, Brewhouse Hill, Wheathampstead, Hertfordshire AL4 8AN, United Kingdom ([www.hsa.org.uk](http://www.hsa.org.uk)).

Annex E (contd)

**Figure 4.** The optimum shooting position for pigs is just above eye level, with the shot directed down the line of the spinal cord.

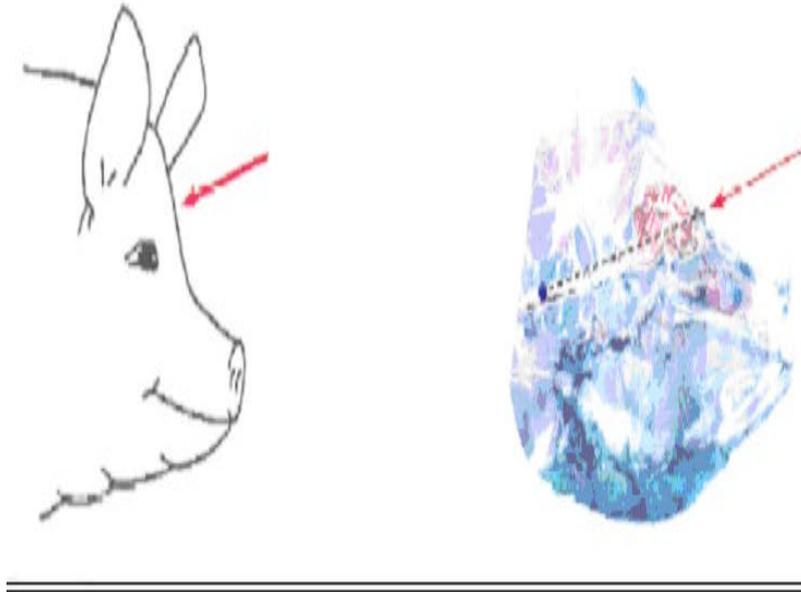


Figure source: Humane Slaughter Association (2005) Guidance Notes No. 3: Humane Killing of Livestock Using Firearms. Published by the Humane Slaughter Association, The Old School, Brewhouse Hill, Wheathampstead, Hertfordshire AL4 8AN, United Kingdom ([www.hsa.org.uk](http://www.hsa.org.uk)).

Article 7.6.7.

### **Penetrating captive bolt**

#### 1. Introduction

A penetrating captive bolt is fired from a gun powered by either compressed air or a blank cartridge. There is no free projectile.

The captive bolt should be aimed on the skull in a position to penetrate the cortex and mid-brain of the *animal*. The impact of the bolt on the skull produces unconsciousness. Physical damage to the brain caused by penetration of the bolt may result in *death*, however, pithing or bleeding should be performed as soon as possible after the shot to ensure the *death* of the *animal*. Shooting poultry species with the captive bolts results in immediate destruction of the skull and brain, causing *death*

#### 2. Requirements for effective use

- a) For cartridge powered and compressed air guns, the bolt velocity and the length of the bolt should be appropriate to the species and type of *animal*, in accordance with the recommendations of the manufacturer.
- b) Captive bolt guns should be frequently cleaned and maintained in good working condition.
- c) More than one gun may be necessary to avoid overheating, and a back-up gun should be available in the event of an ineffective shot.
- d) *Animals* should be restrained; at a minimum, they should be penned for cartridge powered guns and in a race for compressed air guns.

- e) The operator should ensure that the head of the *animal* is accessible.
- f) The operator should fire the captive bolt at right angles to the skull in the optimal position (see figures 1, 3 & 4. The optimum shooting position for hornless sheep is on the highest point of the head, on the midline and aim towards the angle of the jaw).
- g) To ensure the *death* of the *animal*, pithing or bleeding should be performed as soon as possible after *stunning*.
- h) *Animals* should be monitored continuously after *stunning* until *death* to ensure the absence of brain stem reflexes.

### 3. Advantages

- a) Mobility of cartridge powered equipment reduces the need to move *animals*.
- b) The method induces an immediate onset of a sustained period of unconsciousness.

### 4. Disadvantages

- a) Poor gun maintenance and misfiring, and inaccurate gun positioning and orientation may result in poor *animal welfare*.
- b) Post stun convulsions may make pithing difficult and hazardous.
- c) The method is difficult to apply in agitated *animals*.
- d) Repeated use of a cartridge powered gun may result in over-heating.
- e) Leakage of bodily fluids may present a biosecurity risk.
- f) Destruction of brain tissue may preclude diagnosis of some *diseases*.

### 5. Conclusions

The method is suitable for poultry, cattle, sheep, goats and pigs (except neonates), when followed by pithing or bleeding.

Article 7.6.8.

## **Non-penetrating captive bolt**

### 1. Introduction

A non-penetrating captive bolt is fired from a gun powered by either compressed air or a blank cartridge. There is no free projectile.

The gun should be placed on the front of the skull to deliver a percussive blow which produces unconsciousness in cattle (adults only), sheep, goats and pigs, and *death* in *poultry* and neonate sheep, goats and pigs. Bleeding should be performed as soon as possible after the blow to ensure the *death* of the *animal*.

Annex E (contd)2. Requirements for effective use

- a) For cartridge powered and compressed air guns, the bolt velocity should be appropriate to the species and type of *animal*, in accordance with the recommendations of the manufacturer.
- b) Captive bolt guns should be frequently cleaned and maintained in good working condition.
- c) More than one gun may be necessary to avoid overheating, and a back-up gun should be available in the event of an ineffective shot.
- d) *Animals* should be restrained; at a minimum mammals should be penned for cartridge powered guns and in a race for compressed air guns; birds should be restrained in cones, shackles, crushes or by hand.
- e) The operator should ensure that the head of the *animal* is accessible.
- f) The operator should fire the captive bolt at right angles to the skull in the optimal position (figures 1-4).
- g) To ensure *death* in non-neonate mammals, bleeding should be performed as soon as possible after *stunning*.
- h) *Animals* should be monitored continuously after *stunning* until *death* to ensure the absence of brain stem reflexes.

3. Advantages

- a) The method induces an immediate onset of unconsciousness, and *death* in birds and neonates.
- b) Mobility of equipment reduces the need to move *animals*.

4. Disadvantages

- a) As consciousness can be regained quickly in non-neonate mammals, they should be bled as soon as possible after *stunning*.
- b) Laying hens in cages have to be removed from their cages and most birds have to be restrained.
- c) Poor gun maintenance and misfiring, and inaccurate gun positioning and orientation may result in poor *animal welfare*.
- d) Post stun convulsions may make bleeding difficult and hazardous.
- e) Difficult to apply in agitated *animals*, such *animals* may be sedated in advance of the *killing* procedure.
- f) Repeated use of a cartridge powered gun may result in over-heating.
- g) Bleeding may present a biosecurity risk.

5. Conclusions

The method is suitable for *killing poultry*, and neonate sheep, goats and pigs up to a maximum weight of 10 kg.

## Article 7.6.9.

**Maceration**1. Introduction

Maceration, utilising a mechanical apparatus with rotating blades or projections, causes immediate fragmentation and *death* in **day-old newly hatched** poultry and embryonated eggs.

2. Requirements

- a) Maceration requires specialised equipment which should be kept in excellent working order.
- b) The rate of introducing the birds should not allow the equipment to jam, birds to rebound from the blades or the birds to suffocate before they are macerated.

3. Advantages

- a) Procedure results in immediate *death*.
- b) Large numbers can be killed quickly.

4. Disadvantages

- a) Specialised equipment is required.
- b) Macerated tissues may present biosecurity or human health risks.
- c) The cleaning of the equipment can be a source of contamination.

5. Conclusion

The method is suitable for *killing* day-old poultry and embryonated eggs.

## Article 7.6.10.

**Electrical – two-stage application**1. Introduction

A two-stage application of electric current comprises firstly an application of current to the head by scissor-type tongs, immediately followed by an application of the tongs across the chest in a position that spans the heart.

The application of sufficient electric current to the head will induce ‘tonic/clonic’ epilepsy and unconsciousness. Once the *animal* is unconscious, the second stage will induce ventricular fibrillation (cardiac arrest) resulting in *death*. The second stage (the application of low frequency current across the chest) should only be applied to unconscious *animals* to prevent unacceptable levels of pain.

Annex E (contd)2. Requirements for effective use

- a) The stunner control device should generate a low frequency (AC sine wave 50 Hz) current with a minimum voltage and current as set out in the following table:

Animal	Minimum voltage (V)	Minimum current (A)
Cattle	220	1.5
Sheep	220	1.0
Pigs over 6 weeks of age	220	1.3
Pigs less than 6 weeks of age	125	0.5

- b) Appropriate protective clothing (including rubber gloves and boots) should be worn.
- c) *Animals* should be restrained, at a minimum free-standing in a pen, close to an electrical supply.
- d) Two team members are required, the first to apply the electrodes and the second to manipulate the position of the *animal* to allow the second application to be made.
- e) A *stunning* current should be applied via scissor-type *stunning* tongs in a position that spans the brain for a minimum of 3 seconds; immediately following the application to the head, the electrodes should be transferred to a position that spans the heart and the electrodes applied for a minimum of 3 seconds.
- f) Electrodes should be cleaned regularly and after use, to enable optimum electrical contact to be maintained.
- g) *Animals* should be monitored continuously after *stunning* until *death* to ensure the absence of brain stem reflexes.
- h) Electrodes should be applied firmly for the intended duration of time and pressure not released until the stun is complete.

3. Advantages

- a) The application of the second stage minimises post-stun convulsions and therefore the method is particularly effective with pigs.
- b) Non-invasive technique minimises biosecurity risk.

4. Disadvantages

- a) The method requires a reliable supply of electricity.
- b) The electrodes must be applied and maintained in the correct positions to produce an effective stun and kill.
- c) Most stunner control devices utilise low voltage impedance sensing as an electronic switch prior to the application of high voltages; in unshorn sheep, contact impedance may be too high to switch on the required high voltage (especially during stage two).
- d) The procedure may be physically demanding, leading to operator fatigue and poor electrode placement.

## 5. Conclusion

The method is suitable for calves, sheep and goats, and especially for pigs (over one week of age).



Article 7.6.11.

## **Electrical – single application**

### 1. Method 1

Method 1 comprises the single application of sufficient electrical current to the head and back, to simultaneously stun the *animal* and fibrillate the heart. Provided sufficient current is applied in a position that spans both the brain and heart, the *animal* will not recover consciousness.

#### a) Requirements for effective use

- i) The stunner control device should generate a low frequency (30–60 Hz) current with a minimum voltage of 250 volts true RMS under load.
- ii) Appropriate protective clothing (including rubber gloves and boots) should be worn.
- iii) *Animals* should be individually and mechanically restrained close to an electrical supply as the maintenance of physical contact between the *stunning* electrodes and the *animal* is necessary for effective use.
- iv) The rear electrode should be applied to the back, above or behind the heart, and then the front electrode in a position that is forward of the eyes, with current applied for a minimum of 3 seconds.
- v) Electrodes should be cleaned regularly between *animals* and after use, to enable optimum electrical contact to be maintained.
- vi) Water or saline may be necessary to improve electrical contact with sheep.
- vii) An effective stun and kill should be verified by the absence of brain stem reflexes.

#### b) Advantages

- i) Method 1 stuns and kills simultaneously.
- ii) It minimises post-stun convulsions and therefore is particularly effective with pigs.
- iii) A single team member only is required for the application.
- iv) Non-invasive technique minimises biosecurity risk.

Annex E (contd)

## c) Disadvantages

- i) Method 1 requires individual mechanical animal *restraint*.
- ii) The electrodes must be applied and maintained in the correct positions to produce an effective stun and kill.
- iii) Method 1 requires a reliable supply of electricity.

## d) Conclusion

Method 1 is suitable for calves, sheep, goats, and pigs (over one week of age).

2. Method 2

Method 2 stuns and kills by drawing inverted and shackled *poultry* through an electrified waterbath stunner. Electrical contact is made between the 'live' water and earthed shackle and, when sufficient current is applied, *poultry* will be simultaneously stunned and killed.

## a) Requirements for effective use

- i) A mobile waterbath stunner and a short loop of processing line are required.
- ii) A low frequency (50-60 Hz) current applied for a minimum of 3 seconds is necessary to stun and kill the birds.
- iii) *Poultry* need to be manually removed from their cage, house or yard, inverted and shackled onto a line which conveys them through a waterbath stunner with their heads fully immersed.
- iv) The required minimum currents to stun and kill dry birds are:
  - Quails - 100 mA/bird
  - Chickens – 160 mA/bird
  - Ducks & geese – 200 mA/bird
  - Turkeys – 250 mA/bird.

A higher current is required for wet birds.

- v) An effective stun and kill should be verified by the absence of brain stem reflexes.

## b) Advantages

- i) Method 2 stuns and kills simultaneously.
- ii) It is capable of processing large numbers of birds reliably and effectively.
- iii) This non-invasive technique minimises biosecurity risk.

## c) Disadvantages

- i) Method 2 requires a reliable supply of electricity.
- ii) Handling, inversion and shackling of birds are required.

## d) Conclusion

Method 2 is suitable for large numbers of *poultry*.

3. Method 3

Method 3 comprises the single application of sufficient electrical current to the head of *poultry* in a position that spans the brain, causing unconsciousness; this is followed by a *killing* method (see Article 7.6.17.).

## a) Requirements for effective use

- i) The stunner control device should generate sufficient current (more than 600 mA/duck and more than 300 mA/bird) to stun.
- ii) Appropriate protective clothing (including rubber gloves and boots) should be worn.
- iii) Birds should be restrained, at a minimum manually, close to an electrical supply.
- iv) Electrodes should be cleaned regularly and after use, to enable optimum electrical contact to be maintained.
- v) Birds should be monitored continuously after *stunning* until *death* to ensure the absence of brain stem reflexes.

## b) Advantages

Non-invasive technique (when combined with cervical dislocation) minimises biosecurity risk.

## c) Disadvantages

- i) Method 3 requires a reliable supply of electricity and is not suitable for large-scale operations.
- ii) The electrodes must be applied and maintained in the correct position to produce an effective stun.
- iii) Birds must be individually restrained.
- iv) It must be followed by a *killing* method.

## d) Conclusion

Method 3 is suitable for small numbers of *poultry*.

**CO<sub>2</sub> / air mixture (under study)**1. Introduction

Controlled atmosphere *killing* is performed by exposing *animals* to a predetermined gas mixture, either by placing them in a gas-filled container or apparatus (Method 1) or by the gas being introduced into a *poultry* house (Method 2) or by placing transport modules or crates containing birds in a gas tight container and introducing a gas mixture (Method 3). Method 2 should be used whenever possible, as it eliminates *welfare* issues resulting from the need to manually remove live birds. Although Method 3 requires handling and crating of the birds, it benefits overall bird *welfare* as it eliminates chances of causing *death* by smothering or suffocation when compared with Method 1.

Inhalation of carbon dioxide (CO<sub>2</sub>) induces respiratory and metabolic acidosis and hence reduces the pH of cerebrospinal fluid (CSF) and neurones thereby causing unconsciousness and, after prolonged exposure, *death*. Exposure to carbon dioxide does not induce immediate loss of consciousness; therefore the aversiveness of various gas mixtures containing high concentrations of CO<sub>2</sub> and the respiratory distress occurring during the induction phase, are important *animal welfare* considerations.

2. Method 1

The *animals* are placed in a gas-filled *container* or apparatus.

a) Requirements for effective use in a *container* or apparatus

- i) *Containers* or apparatus should allow the required gas concentration to be maintained and accurately measured.
- ii) When *animals* are exposed to the gas individually or in small groups in a container or apparatus, the equipment used should be designed, constructed, and maintained in such a way as to avoid injury to the *animals* and allow them to be observed.
- iii) *Animals* can also be introduced to low concentrations (as low concentrations are not aversive) and the concentration could be increased afterwards and the *animals* then held in the higher concentration until *death* is confirmed.
- iv) Team members should ensure that there is sufficient time allowed for each batch of *animals* to die before subsequent ones are introduced into the *container* or apparatus.
- v) *Containers* or apparatus should not be overcrowded and measures are needed to avoid *animals* suffocating by climbing on top of each other.

## b) Advantages

- i) CO<sub>2</sub> is readily available.
- ii) Application methods are simple.

## c) Disadvantages

- i) The need for properly designed *container* or apparatus.
- ii) The aversive nature of high CO<sub>2</sub> concentrations.
- iii) No immediate loss of consciousness.
- iv) The risk of suffocation due to overcrowding.
- v) Difficulty in verifying *death* while the *animals* are in the container or apparatus.

## d) Conclusion

Method 1 is suitable for use in *poultry*, and neonatal sheep, goats and pigs. But CO<sub>2</sub> is likely to cause a period of distress in the *animals* before they lose consciousness.

**3. Method 2**

In this method, the crates or modules full of birds are loaded into a chamber and gas is introduced into the chamber. As shown in the example below, each containerised gassing unit (CGU) typically consists of a gas-tight chamber designed to accommodate *poultry* transport crates or a module. The chamber is fitted with gas lines and diffusers, with silencers which in turn are connected via a system of manifolds and gas regulators to gas cylinders. There is a hole at the top to permit displaced air to escape during filling the container with gas.

Procedures involved in the operation of CGU includes (a) position the container on a level solid open ground; (b) connect gas cylinder to the container (c) load a module full of birds into the container, (d) shut and secure the door, (e) deliver the gas until 45% by volume of carbon dioxide was achieved at the top of the container, (f) allow time for the birds to become unconscious and die, (g) open the door, allow gas to be dispersed in air, (h) remove the module, (i) check each drawer for survivors; (j) humanely kill survivors, if any; and (k) dispose carcasses appropriately.



Figure source: Department of Clinical Veterinary Science, University of Bristol, United Kingdom

Annex E (contd)

Figure source: Department of Clinical Veterinary Science, University of Bristol, United Kingdom



Figure source: Department of Clinical Veterinary Science, University of Bristol, Langford, Bristol, United Kingdom

a) Requirements for effective use of containerised gassing units (CGU)

- i) The birds should be gently caught and placed in crates or modules of appropriate size and at appropriate stocking densities to allow all birds to sit down.
- ii) The crates or module full of birds should be placed inside the container and the door shut only when the operator is ready to administer the gas.
- iii) Ensure the container door is locked and administer the gas until a minimum of 40% carbon dioxide is achieved on top of the crates.
- iv) Appropriate gas meter should be used to monitor and maintain the level of carbon dioxide continuously during the operation.

- v) Sufficient exposure time should be allowed for birds to die before the door is opened. Cessation of vocalisation and convulsive wing flapping sounds, which can be listened to by standing couple of metres away from the container, can be used to determine the presence of unconsciousness, and death will be imminent. Remove the crates or modules out of the container and leave them in atmospheric air.
  - vi) Each crate or module should be examined and birds checked to ensure they are dead. Dilated pupils and absence of breathing movements under this situation indicate death.
  - vii) Any survivors should be humanely killed.
  - viii) Ducks and geese are resilient to the effects of carbon dioxide and therefore require a minimum of 80% CO<sub>2</sub> and longer exposure time to die.
- b) Advantages
- i) The gas is introduced quickly and quietly resulting in less turbulence and disturbance to the birds.
  - ii) Gradual rising of CO<sub>2</sub> concentration minimises the aversiveness of the induction of unconsciousness with this gas.
  - iii) The use of transport crates or modules to move birds minimises handling. Birds should be handled by trained, experienced catching teams at the time of depopulation of the poultry house.
  - iv) The modules are loaded mechanically into the CGU and a lethal mixture of gas is rapidly introduced into the chamber immediately after sealing.
  - v) CO<sub>2</sub> is readily available.
  - vi) Birds are exposed to gas more uniformly and they do not smother each other when compared with Method 1.
  - vii) The volume of gas required can be readily calculated.
  - viii) As the units are operated outdoors, the gas is dispersed quickly at the end of each cycle by opening the door, improving operators health and safety.
  - ix) The system uses skilled catching teams and equipment in daily use by the industry.
  - x) Metal containers can be readily cleansed and disinfected.
- c) Disadvantages
- i) Requires trained operators, trained catchers, transport modules and fork lift but such equipment is usually available and suitable area with hard surface.
  - ii) The main limiting factors are speed of catching and availability of gas.
  - iii) It is difficult to visually confirm death while the birds are still in the container (however, cessation of vocalisations can be used to determine onset of death).

## Annex E (contd)

**d) Conclusion**

- i) Method 3 is suitable for use in *poultry* in a wide range of *poultry* systems which have access to vehicles to carry containers and handling equipment.**
- ii) *Animals* should be introduced into the container or apparatus, which is then sealed and filled as quickly as possible thereafter with the required gas concentrations, i.e. more than 40% CO<sub>2</sub> and held in this atmosphere until *death* is confirmed.**
- iii) Method 3 is suitable for use in *poultry*, and neonatal sheep, goats and pigs. But CO<sub>2</sub> is likely to cause a period of distress in the *animals* before they lose consciousness.**

**24. Method 2<sup>3</sup>**

The gas is introduced into a *poultry* house.

## a) Requirements for effective use in a poultry house

- i) Prior to introduction of the CO<sub>2</sub>, the *poultry* house should be appropriately sealed to allow control over the gas concentration. The interval between sealing and gas administration should be kept to the minimum so as to avoid overheating.**

**Forced ventilation systems, where fitted, will have to be switched off prior to gas administration.**

**Mains water supply to the house may have to be turned off and water drained to avoid freezing and bursting of water pipes.**

**Feeders and water troughs will have to be lifted to avoid obstruction and prevent injury to birds.**

- ii) Gas delivery pipes or lancets should be positioned appropriately such that birds are not hit directly by the very cold gas delivered at high pressures. It may be necessary that birds are excluded at the front of the delivery pipes for a distance of about 20 meters by partitioning the house with nets, wire mesh or similarly perforated materials.**
- iii) The house should be gradually filled with CO<sub>2</sub> so that all birds are exposed to a concentration of >40% until they are dead; a vaporiser may be required to prevent freezing.**
- iv) Devices should be used to accurately measure the gas concentration at the maximum height accommodation of birds.**

## b) Advantages

- i) Applying gas to birds *in situ* eliminates the need to manually remove live birds.
- ii) CO<sub>2</sub> is readily available.
- iii) Gradual raising of CO<sub>2</sub> concentration minimises the aversiveness of the induction of unconsciousness.

## c) Disadvantages

- i) It is difficult to determine volume of gas required to achieve adequate concentrations of CO<sub>2</sub> in some *poultry* houses.
- ii) It is difficult to verify *death* while the birds are in the *poultry* house.

iii) The extremely low temperature of liquid CO<sub>2</sub> entering the house and formation of solid CO<sub>2</sub> (dry ice) are also bird welfare concerns.

d) Conclusion

Method 2 is suitable for use in *poultry* in closed-environment sheds. This method could be developed for killing pigs. But CO<sub>2</sub> is likely to cause a period of distress in the birds before they lose consciousness.

Article 7.6.13.

## Nitrogen and/or inert gas mixed with CO<sub>2</sub>

### 1. Introduction

CO<sub>2</sub> may be mixed in various proportions with nitrogen or an inert gas (e.g. argon), and the inhalation of such mixtures leads to hypercapnic-hypoxia and *death* when the oxygen concentration by volume is <2%. Various mixtures of CO<sub>2</sub> and nitrogen or an inert gas can be administered to kill birds using Methods 1 and 3 described under Article 7.6.12. Whole house gassing with mixtures of CO<sub>2</sub> and nitrogen or an inert gas has not been tested owing to the complexity of mixing gases in large quantities. Such mixtures however do not induce immediate loss of consciousness, therefore the aversiveness of various gas mixtures containing high concentrations of CO<sub>2</sub> and the respiratory distress occurring during the induction phase, are important *animal welfare* considerations.

Pigs and *poultry* appear not to find low concentrations of CO<sub>2</sub> strongly aversive, and a mixture of nitrogen or argon with <30% CO<sub>2</sub> by volume and <2% O<sub>2</sub> by volume can be used for *killing poultry*, neonatal sheep, goats and pigs.

### 2. Method 1

The *animals* are placed in a gas-filled *container* or apparatus

#### a) Requirements for effective use

- i) *Containers* or apparatus should allow the required gas concentrations to be maintained, and the O<sub>2</sub> and CO<sub>2</sub> concentrations accurately measured during the *killing* procedure.
- ii) When *animals* are exposed to the gases individually or in small groups in a *container* or apparatus, the equipment used should be designed, constructed, and maintained in such a way as to avoid injury to the *animals* and allow them to be observed.
- ii) *Animals* should be introduced into the *container* or apparatus after it has been filled with the required gas concentrations (with <2% O<sub>2</sub>), and held in this atmosphere until *death* is confirmed.
- iv) Team members should ensure that there is sufficient time allowed for each batch of *animals* to die before subsequent ones are introduced into the *container* or apparatus.
- v) *Containers* or apparatus should not be overcrowded and measures are needed to avoid *animals* suffocating by climbing on top of each other.

#### 5-b) Advantages

Low concentrations of CO<sub>2</sub> cause little aversiveness and, in combination with nitrogen or an inert gas, produces a fast induction of unconsciousness.

## Annex E (contd)

**4. c) Disadvantages**

- i) A properly designed *container* or apparatus is needed.
- ii) It is difficult to verify *death* while the *animals* are in the *container* or apparatus.
- iii) There is no immediate loss of consciousness.
- iv) Exposure times required to kill are considerable.

**5. d) Conclusion**

The method is suitable for *poultry*, and for neonatal sheep, goats and pigs.

**3. Method 2**

In this method, the crates or modules full of birds are loaded into a container and gas is introduced into the container (refer to Figures under Article 7.6.12). As shown in the example below, each containerised gassing unit (CGU) typically consists of a gas-tight chamber designed to accommodate *poultry* transport crates or a module. The container or chamber is fitted with gas lines and diffusers, with silencers which in turn are connected via a system of manifolds and gas regulators to gas cylinders. There is a hole at the top to permit displaced air to escape during filling the container with gas.

Procedures involved in the operation of CGU includes (a) position the container on a level solid open ground; (b) connect gas cylinder to the container (c) load a module full of birds into the container, (d) shut and secure the door, (e) deliver the gas until <2% by volume of oxygen was achieved at the top of the container, (f) allow time for the birds to become unconscious and die, (g) open the door, allow gas to be dispersed in air, (h) remove the module, (i) check each drawer for survivors; (j) humanely kill survivors, if any; and (k) dispose carcasses appropriately.

**a) Requirements for effective use of containerised gassing units (CGU)**

- i)** The birds should be gently caught and placed in crates or modules of appropriate size and at appropriate stocking densities to allow all birds to sit down.
- ii)** The crates or module full of birds should be placed inside the container and the door shut only when the operator is ready to administer the gas mixture.
- iii)** Ensure the container door is locked and administer the gas mixture until <2% residual oxygen is achieved on top of the crates.
- iv)** Appropriate gas meter should be used to monitor and maintain the level of oxygen continuously during the operation.
- v)** Sufficient exposure time should be allowed for birds to die before the door is opened. Cessation of vocalisation and wing flapping sounds, which can be listened to by standing couple of metres away from the container, can be used to determine the onset of *death* in birds. Remove the crates or modules out of the container and leave them in atmospheric air.
- vi)** Each crate or module should be examined and birds checked to ensure they are dead. Dilated pupils and absence of breathing movements under this situation indicate *death*.

vii) Any survivors should be humanely killed.

viii) Ducks and geese do not appear to be resilient to the effects of a mixture 20% carbon dioxide and 80% nitrogen or argon.

**b) Advantages**

i) The gas mixture is introduced quickly and quietly resulting in less turbulence and disturbance to the birds.

ii) The use of transport crates or modules to move birds minimises handling. Birds should be handled by trained, experienced catching teams at the time of depopulation of the *poultry* house.

iii) The modules are loaded mechanically into the CGU and a lethal mixture of gas is rapidly introduced into the chamber immediately after sealing.

iv) Mixtures containing up to 20% carbon dioxide in argon are readily available as welding gas cylinders.

v) Birds are exposed to gas more uniformly and they do not smother each other when compared with Method 1.

vi) Two CGU can be operated in tandem and throughputs of up to 4,000 chickens per hour are possible.

vii) The volume of gas required can be readily calculated.

viii) As the units are operated outdoors the gas is dispersed quickly at the end of each cycle by opening the door, improving operators' health and safety.

ix) The system uses skilled catching teams and equipment in daily use by the industry.

x) Metal containers can be readily cleansed and disinfected.

**c) Disadvantages**

i) Requires trained operators, trained catchers, transport modules and fork lift but such equipment is usually available and suitable area with hard surface.

ii) The main limiting factors are speed of catching and availability of gas mixtures.

iii) It is difficult to visually confirm *death* while the birds are still in the container (however cessation of localisations can be used to determine onset of *death*).

**d) Conclusion**

i) Method 2 is suitable for *poultry*, and for neonatal sheep, goats and pigs.

ii) Method 2 is suitable for use in *poultry* in a wide range of *poultry* systems which have access to vehicles to carry containers and handling equipment.

iii) *Animals* should be introduced into the container or apparatus, which is then sealed and filled as quickly as possible thereafter with the gas mixtures and a residual oxygen of less than 2% should be achieved and maintained, and birds should be held in this atmosphere until *death* is confirmed.

## **Nitrogen and/or inert gases**

### 1. Introduction

This method involves the introduction of *animals* into a container or apparatus containing nitrogen or an inert gas such as argon. The controlled atmosphere produced leads to unconsciousness and *death* from hypoxia.

Research has shown that hypoxia is not aversive to pigs and *poultry*, and it does not induce any signs of respiratory distress prior to loss of consciousness.

### 2. Requirements for effective use

- a) *Containers* or apparatus should allow the required gas concentrations to be maintained, and the O<sub>2</sub> concentration accurately measured.
- b) When *animals* are exposed to the gases individually or in small groups in a *container* or apparatus, the equipment used should be designed, constructed, and maintained in such a way as to avoid injury to the *animals* and allow them to be observed.
- c) *Animals* should be introduced into the *container* or apparatus after it has been filled with the required gas concentrations (with <2% O<sub>2</sub>), and held in this atmosphere until *death* is confirmed.
- d) Team members should ensure that there is sufficient time allowed for each batch of *animals* to die before subsequent ones are introduced into the *container* or apparatus.
- e) *Containers* or apparatus should not be overcrowded, and measures are needed to avoid *animals* suffocating by climbing on top of each other.

### 3. Advantages

*Animals* are unable to detect nitrogen or inert gases, and the induction of hypoxia by this method is not aversive to *animals*.

### 4. Disadvantages

- a) A properly designed *container* or apparatus is needed.
- b) It is difficult to verify *death* while the *animals* are in the *container* or apparatus.
- c) There is no immediate loss of consciousness.
- d) Exposure times required to kill are considerable.

### 5. Conclusion

The method is suitable for *poultry* and neonatal sheep, goats and pigs.

Whole house gassing of *poultry* with nitrogen has been tested in Denmark and Sweden. Nitrogen can also be used in containerised gassing systems however evidence is lacking. Therefore, these two methods of administration could be described as under development.

## Article 7.6.15.

**Lethal injection**1. Introduction

A lethal injection using high doses of anaesthetic and sedative drugs causes CNS depression, unconsciousness and *death*. In practice, barbiturates in combination with other drugs are commonly used.

2. Requirements for effective use

- a) Doses and routes of administration that cause rapid loss of consciousness followed by *death* should be used.
- b) Prior sedation may be necessary for some *animals*.
- c) Intravenous administration is preferred, but intraperitoneal or intramuscular administration may be appropriate, especially if the agent is non-irritating.
- d) *Animals* should be restrained to allow effective administration.
- e) *Animals* should be monitored to ensure the absence of brain stem reflexes.

3. Advantages

- a) The method can be used in all species.
- b) *Death* can be induced smoothly.

4. Disadvantages

- a) *Restraint* and/or sedation may be necessary prior to injection.
- b) Some combinations of drug type and route of administration may be painful, and should only be used in unconscious *animals*.
- c) Legal requirements and skill/training required may restrict use to veterinarians.
- d) Contaminated carcasses may present a risk to other wild or domestic *animals*.

5. Conclusion

The method is suitable for *killing* small numbers of cattle, sheep, goats, pigs and *poultry*.

## Article 7.6.16.

**Addition of anaesthetics to feed or water**1. Introduction

An anaesthetic agent which can be mixed with *poultry* feed or water may be used to kill *poultry* in houses. *Poultry* which are only anaesthetised need to be killed by another method such as cervical dislocation.

Annex E (contd)2. Requirements for effective use

- a) Sufficient quantities of anaesthetic need to be ingested rapidly for effective response.
- b) Intake of sufficient quantities is facilitated if the birds are fasted or water is withheld.
- c) Must be followed by *killing* (see Article 7.6.17.) if birds are anaesthetised only.

3. Advantages

- a) Handling is not required until birds are anaesthetised.
- b) There may be biosecurity advantages in the case of large numbers of diseased birds.

4. Disadvantages

- a) Non-target *animals* may accidentally access the medicated feed or water when provided in an open environment.
- b) Dose taken is unable to be regulated and variable results may be obtained.
- c) *Animals* may reject adulterated feed or water due to illness or adverse flavour.
- d) The method may need to be followed by *killing*.
- e) Care is essential in the preparation and provision of treated feed or water, and in the disposal of uneaten treated feed/water and contaminated carcasses.

5. Conclusion

The method is suitable for *killing* large numbers of *poultry* in houses, **provided a back-up method is available to kill birds that are only anaesthetised**

Article 7.6.17.

**Cervical dislocation and decapitation**1. Cervical dislocation (manual and mechanical)

## a) Introduction

Unconscious *poultry* may be killed by either manual cervical dislocation (stretching) or mechanical neck crushing with a pair of pliers. Both methods result in *death* from cerebral anoxia due to cessation of breathing and/or blood supply to the brain.

When the number of birds to be killed is small, and other methods of *killing* are not available, or are impracticable, conscious birds **of less than 3 kilograms** may be killed using cervical dislocation in a way that the blood vessels of the neck are severed. **and death is instantaneous.**

## b) Requirements for effective use

- i) *Killing* should be performed either by manually or mechanically stretching the neck to sever the spinal cord or by using mechanical pliers to crush the cervical vertebrae with consequent major damage to the spinal cord.

- ii) Consistent results require strength and skill so team members should be rested regularly to ensure consistently reliable results.
- iii) Birds should be monitored continuously until *death* to ensure the absence of brain stem reflexes.
- c) Advantages
  - i) It is a non-invasive *killing* method.
  - ii) It can be performed manually on small birds.
- d) Disadvantages
  - i) Operator fatigue.
  - ii) The method is more difficult in larger birds.
  - iii) Requires trained personnel to perform humanely.
  - iv) Human health and safety concerns due to handling of the birds.
  - v) Additional stress to the *animals* from handling.

## 2. Decapitation

- a) Introduction
  - i) Decapitation results in *death* by cerebral ischaemia using a guillotine or knife.
- b) Requirements for effective use
  - i) The required equipment should be kept in good working order.
- c) Advantages
  - i) The technique is effective and does not require monitoring.
- d) Disadvantages
  - i) The working area is contaminated with body fluids, which increases biosecurity risks.
  - ii) Pain due to loss of consciousness not being immediate.

Article 7.6.18.

## **Pithing and bleeding**

### 1. Pithing

- a) Introduction

Pithing is a method of *killing animals* which have been stunned by a penetrating captive bolt, without immediate *death*. Pithing results in the physical destruction of the brain and upper regions of the spinal cord, through the insertion of a rod or cane through the bolt hole.

Annex E (contd)

- b) Requirements for effective use
  - i) Pithing cane or rod is required.
  - ii) An access to the head of the *animal* and to the brain through the skull is required.
  - iii) *Animals* should be monitored continuously until *death* to ensure the absence of brain stem reflexes.
- c) Advantages
 

The technique is effective in producing immediate *death*.
- d) Disadvantages
  - i) A delayed and/or ineffective pithing due to convulsions may occur.
  - ii) The working area is contaminated with body fluids, which increases biosecurity risks.

2. Bleeding

- a) Introduction
 

Bleeding is a method of *killing animals* through the severance of the major blood vessels in the neck or chest that results in a rapid fall in blood pressure, leading to cerebral ischaemia and *death*.
- b) Requirements for effective use
  - i) A sharp knife is required.
  - ii) An access to the neck or chest of the *animal* is required.
  - iii) *Animals* should be monitored continuously until *death* to ensure the absence of brain stem reflexes.
- c) Advantages
 

The technique is effective in producing *death* after an effective *stunning* method which does not permit pithing.
- d) Disadvantages
  - i) A delayed and/or ineffective bleeding due to convulsions may occur.
  - ii) The working area is contaminated with body fluids, which increases biosecurity risks.

Article 7.6.19. (under study)

**Foam as a killing method for poultry****1. Introduction**

In fire fighting terms, foam is usually defined, on the basis of volume of foam produced to the volume of liquid used as low (20:1), medium (up to 200:1) and high (over 200:1) expansion foam. Medium expansion fire fighting foam made using air bubble has been used to create a blanket over live birds in order to deprive them of oxygen, and causing *death*. It was concluded that birds died due to occlusion of the upper respiratory tract with the foam. A physiological definition of suffocation is the physical separation of the upper respiratory tract from the atmospheric air, and therefore, occlusion of the upper respiratory tract with foam or water would amount to *death* due to suffocation or asphyxiation, which are unacceptable from *animal welfare* point of view.

Therefore, high expansion foam made with 100% carbon dioxide or nitrogen has been tested for killing poultry. Research has shown that birds do not show any aversive reactions to high expansion foam with large diameter (10 to 50 mm) made using gases. Therefore, high expansion foam with large diameter and made using industrial gases such as carbon dioxide or nitrogen has potential to be an acceptable method of killing poultry.

## 2. Requirements for effective use

- a) Foam expansion ratio should be at least 300:1.
- b) Diameter of foam should be at least 10mm.
- c) Foam should be made using 100% carbon dioxide, nitrogen or inert gases (argon) or mixtures of these gases.
- d) Surfactant used in foam making should be non-irritant, non-corrosive and the surfactant and water mixture should be buffered adequately to avoid causing discomfort to birds.
- v) Foam should be administered into poultry houses as rapidly as possible in a calm manner, without causing distress or panic among the birds.

## 3. Advantages

- a) Foam can be administered without entering poultry houses.
- b) Administration of a gas in foam will minimise disturbances to live birds.
- c) Poultry houses may not have to be sealed for the purpose containing gases.
- d) Standard firefighting foam makers can be deployed.

## 4. Disadvantages

- i) Availability of foam making devices, surfactants and gas in large quantities.
- ii) Surface run-off and its consequences for biosecurity.

## 4. Conclusion

High expansion foam with large diameter and made using industrial gases such as carbon dioxide or nitrogen has potential to be an acceptable method of killing poultry.

Article 7.6.20.(under study)

## Use of carbon monoxide for killing poultry.

### 1. Introduction

Inhalation of carbon monoxide leads to unconsciousness and death. However some argue that convulsions may occur prior to loss of consciousness. It is also lethal at low concentrations and highly explosive at concentrations above 12.5% by volume.

## Annex E (contd)

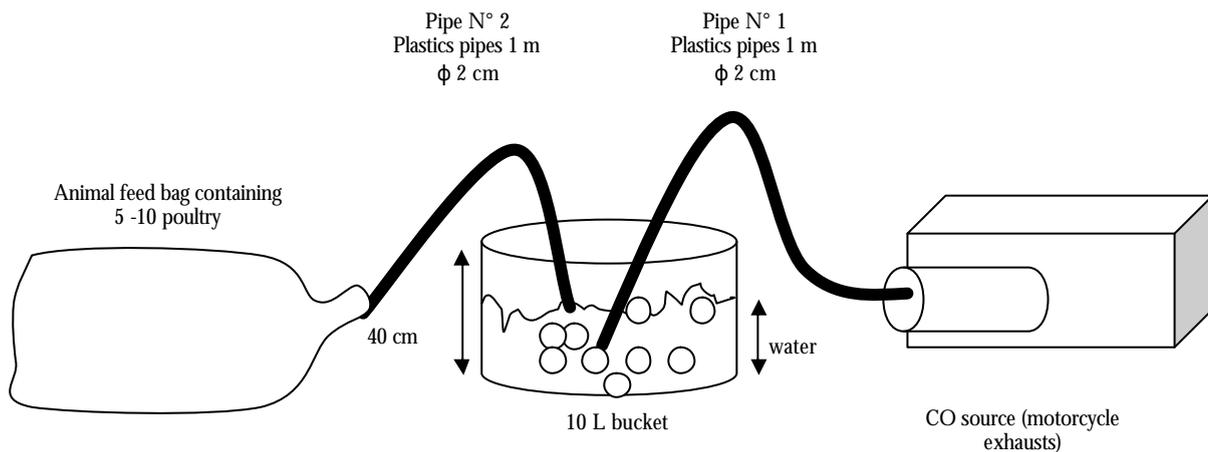
There are two methods of application: Method 1 involves the introduction of *poultry* into a container or apparatus containing carbon monoxide; Method 2 involves administration of carbon monoxide into *poultry* houses.

Carbon monoxide could be delivered from a pure (100%) source or as a mixture of gases generated by using a petrol engine. The concentration required to killing *poultry* has been estimated to be 1.5 to 2.0% in air.

### Method 1 :

Exhaust gas from a badly tuned motorcycle engines has been used to generate carbon monoxide, however in low concentrations. An example is presented in the schematic diagram below.

#### Schema of Method 1



### Method 2 : Administration into *poultry* houses

Carbon monoxide can be delivered using a pure source and it is being lighter than air may diffuse very rapidly throughout the house.

## 2. Requirements for effective use

Carbon monoxide concentration should be measured in both Methods.

### a) Method 1:

- i) The time to attain a lethal concentration of this gas in the container (or bag) will depend upon the generator or engine.

- ii) The exhaust gas should be cooled and filtered prior to administration.
- iii) Poultry should be introduced into the container or apparatus after it has been filled with the required gas concentration, and held in this atmosphere until *death* is confirmed.
- iv) Team members should ensure that there is sufficient time allowed for each batch of *poultry* to die before subsequent ones are introduced into the container or apparatus.
- v) Containers or apparatus should not be overcrowded.
- vi) Operators' health and safety should not be compromised.

#### b) Method 2

An exclusion zone of several meters around the vicinity of the house may ensure human safety and the explosive nature of the gas require the presence of fire brigade.

- i) Carbon monoxide should be delivered using a pure source.

### 3. Conclusion

Carbon monoxide is suitable for *poultry*.

#### Article 7.6.21

Prohibited methods include ventilation shut down as a sole method of killing *poultry*.

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 — text deleted  
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<sup>1</sup> The only preclusion against the use of this method for neonates is the design of the stunning tongs that may not facilitate their application across such a small-sized head/body.





Original: English  
June 2009

## **AD HOC GROUP ON ANIMAL WELFARE AND BROILER CHICKEN PRODUCTION SYSTEMS**

**Paris, 15–17 June 2009**

The OIE *ad hoc* Group on animal welfare and broiler chicken production systems (the *ad hoc* Group) met at the OIE Headquarters on 4–5 June 2009.

The members of the *ad hoc* Group and other participants at the meeting are listed at [Appendix I](#). The adopted Agenda is at [Appendix II](#).

### **Agenda Item 1: Welcome and introduction**

Dr Sarah Kahn, Head of the International Trade Department of the OIE, welcomed all members and thanked them for their agreement to work with the OIE on this important topic. Dr. Kahn explained that the work of this *ad hoc* Group is rather new for the OIE, in that it is the first time the OIE will develop animal welfare recommendations relevant to livestock production systems and OIE Members will likely take a strong interest in this work.

While developing the recommendations the varying conditions that exist in 174 OIE Members Countries and Territories should be taken into account and the recommendations on standards sufficiently flexible to make implementation feasible for Members to the greatest extent possible.

The report of the meeting will be discussed by the OIE Animal Welfare Working Group (AWWG) and (in September 2009) by the Terrestrial Animal Health Standards Commission (the Code Commission). The publication of the report will take place after the Code Commission meeting, in early November 2009. OIE Members normally provide comment on proposed texts on at least two occasions before they are proposed for adoption by the World Assembly of OIE Delegates (previously known as the International Committee). The earliest adoption could occur in June but the development of a new text in the *Terrestrial Animal Health Code* (the *Terrestrial Code*) normally takes about two years.

Dr Kahn drew the attention of members to one of the discussion papers, the report of the first meeting of the *ad hoc* Group on animal welfare and livestock production systems (Paris, 8–10 April 2008) in which three key elements influencing animal welfare are described, i.e.: animal health, environment and management. Dr Joy Mench commented that management should be considered in the context of the first two as this is a determinant of both the health and the environment of the animals.

Dr Bernard Vallat, Director General of the OIE, joined the group on the final day of the meeting. He welcomed and thanked members for their participation. He stressed that OIE standards should not be prescriptive. Rather, they should be flexible and outcome and science based. It is important to include scientific references in the report as science is the common denominator for OIE Members, regardless of their particular circumstances. Dr Vallat confirmed that the development of OIE standards is normally based on a two-year cycle and indicated that the OIE would probably reconvene the *ad hoc* group early in 2010 for the purpose of reviewing Member comments on a draft Chapter.

Annex F (contd)**Agenda Item 2: Confirmation of the Terms of Reference**

Dr Kahn clarified that the TOR were based on the discussion paper prepared by the OIE AWWG and the report of the *ad hoc* Group on animal welfare and livestock production systems. The latter report includes a list of elements to be addressed in OIE guidelines on animal welfare in livestock production systems. The *ad hoc* Group discussed the pros and cons of outcome based and resource based criteria in drafting a *Terrestrial Code* chapter on welfare and the production of broiler chickens. Dr. Sexton mentioned that it is important to keep in mind that the OIE standards are directed to specific target organizations, especially the Veterinary Services. The Group agreed to use the list of elements in the report as the framework for its report and to take into account the OIE guiding principles on animal welfare (*Terrestrial Code* Chapter 7.1).

The *ad hoc* Group adopted the proposed TOR (see Appendix III).

**Agenda Item 3: General discussion**

The following documents were distributed electronically and discussed:

- Report of the first meeting of the *ad hoc* Group on animal welfare and livestock production systems (Paris, 8-10 April 2008)
- EU directive 2007 43
- SCAHAW report
- ICFAW—Core Principles Applicable to the On-farm Welfare of Farm Animals
- ICFAW – OIE Guidelines for the on-farm welfare of chicken raised for meat
- RSPCA broiler standards

Dr Mench proposed to use criteria that address the outcome at the animal level rather than criteria that address the design of the system. She mentioned recent investigations showing that dirty feathers can be used as an indicator of problems with lameness, as the birds sit down on their bedding more frequently, and suggested to include dirty feathers as an outcome based criterion. Prof. Dr. Idrus observed that dirty feathers not only coincides with lameness but could also be related to poor management of litter, which in turn could be related to hygiene. This illustrates the complex interactions between measurables and factors relating to health, environment and management.

Dr Kahn suggested that examples of the two types of criteria should be provided to clarify this terminology as it could otherwise be open to misinterpretation. The table included in the report of the *ad hoc* Group on animal welfare and livestock production systems (see Appendix IV, table 1) gives examples of these two types of criteria for different livestock management systems. The *ad hoc* Group agreed to include in its report a relevant extract from the table dealing with broiler chickens. The *ad hoc* Group agreed to document to the extent possible the relevant outcome based criteria for each of the elements but to use the terminology “measurables” instead of “criteria”, recognising the need to select criteria that are both relevant and amenable to measurement under practical conditions.

The *ad hoc* Group decided to structure its report as follows:

1. Definition of broiler chicken for use in the new *Terrestrial Code* chapter
2. Scope of the recommendations
3. Description of commercial broiler production systems
4. Identification and brief description of relevant ‘outcome based measurables’
5. Recommendations on animal health, environment and management of broiler chickens, each recommendation to be linked to outcome based measurables as appropriate
6. Future work
7. References, and
8. A draft *Terrestrial Code* chapter (at Appendix IV).

### 1. Definition of broiler chicken for use in the new *Terrestrial Animal Health Code* chapter

The *ad hoc* Group discussed the application of the OIE recommendations and decided that these should be designed with application to commercial broiler production, even though backyard production could sometimes involve quite large numbers of birds and that sometimes birds and their products could be bartered or sold in subsistence farming systems.

### 2. Scope of the recommendations

The first priority is to address the period from arrival of day old chicks on the farm to harvesting. Transport from the farm to the abattoir should not be covered in this chapter as it is the subject of recommendations elsewhere in the *Terrestrial Code*. The *ad hoc* Group decided to take note of welfare problems that need to be managed at the level of the breeding flock or hatchery and deal with these subsequently, due to lack of time at this meeting. Recommendations for the period between hatching and arrival on the farm should also be covered in due course.

### 3. Description of commercial broiler production systems

The *ad hoc* Group identified three commercial broiler production systems: a) intensive b) semi intensive and c) extensive. In relation to systems based on rearing broilers in cages, Mr. Hulsbergen explained that a cage system does not necessarily imply small cages with a relatively small number of birds. Some cage systems have large surfaces. The difference between floor and cage housing systems is the way the caretaker accesses the birds. In the situation where the keeper accesses the birds from outside the enclosure, the housing system is considered to be a cage system.

### 4. Criteria (measurables) that are useful indicators of broiler welfare

The *ad hoc* Group agreed that measurables can be based on the outcomes for the animal (outcome based criteria) or the design of the system (resource or design based criteria). The advantages and disadvantages of these two groups of criteria are well described in the report of the first meeting of the *ad hoc* group on animal welfare and livestock production systems. The *ad hoc* Group agreed with the conclusion that outcome based measurables may give a better indication of welfare because they reflect the complex interaction of several variables (e.g. experience and attitude of handlers and disease situation) that may be overlooked when relying on resource based criteria that focus on the design of the system. However, many animal based measurables (e.g. mortality or growth rate) are not very specific and they are frequently interdependent. It could be very difficult to pinpoint the reason for 'poor performance' (insufficient growth rate in combination with feed conversion) in relation to a specific measurable (e.g. elevated mortality) as the effects of poor management, environmental problems and disease conditions could all have an influence in a given situation.

During the discussion it was agreed that it would be impractical at this time to assign numeric values to measurables (e.g. to specify a certain mortality rate as 'acceptable' or 'optimum', due the large variations in the commercial production systems used by the 174 OIE Members. The *ad hoc* Group agreed that such numeric values could be valuable in benchmarking performance and recommended that values should be determined with reference to appropriate national, sectoral or perhaps regional norms for commercial broiler production..

On the basis of detailed discussion the *ad hoc* Group agreed that the following outcome based measurables could be useful indicators of broiler welfare:

#### 4.1. Mortality (dead, culled)

Mortality (dead or culled) should be within the range of the performance sheet any abruptly increase in the daily mortality rate not referred to a specific disease could be related to defect in animal welfare issues.

The outcome based measurable: daily, weekly, cumulative mortality rates compared to the standard one.

Annex F (contd)**4.2. Eye condition**

Broilers chickens are susceptible to developing a variety of infectious and non-infectious musculoskeletal disorders (see review in Mench, 2004). If severe these disorders may lead to overt lameness, and if less severe to gait abnormalities. Birds that are lame or have more serious gait abnormalities may have difficulty reaching the food and water, may be trampled by other birds, and may experience pain. Musculoskeletal problems have many causes, including related to genetics, nutrition, sanitation, lighting, litter quality, and other environmental and management factors (see Mench, 2004; Dawkins et al., 2004). Broilers in commercial flocks should be assessed for gait abnormalities, and corrective actions identified to reduce the incidence of problems in subsequent flocks. There are several gait scoring systems available, including the 6-point Bristol (Kestin et al., 1992) and Modified Gait Scoring (Garner et al., 2002) systems, the 3-point system (Webster et al., 2008), and the Latency-to-Lie test (Weeks et al., 2002; Berg and Sanotra, 2003). Regardless of the scoring or assessment system used, overtly lame birds (e.g. those that would score 4 or 5 on the Bristol or Modified system) should be humanely euthanized as soon as possible after they are observed.

**4.3. Contact dermatitis**

Contact dermatitis affects skin surfaces which have prolonged contact with litter, the foot pad, rear surface of the hock and, when severe, the breast area. The conditions are manifested as blackened skin progressing to erosions and fibrosis on the lower surface of the foot pad, at the back of the hocks, and sometimes in the breast area. If severe the foot and hock lesions may contribute to lameness or serve as a portal of entry for secondary infections.

**4.4. Feather condition**

Evaluation of the feather condition of broilers provides useful information about aspects of welfare. Plumage dirtiness is correlated with both hock burns and lameness for individual birds (Arnould and Colin, 2009). Plumage dirtiness can be assessed when the broilers are caught for transport to the slaughter plant; a scoring system has been developed for this purpose (RSPCA, 2008).

**4.5. Diseases / Disease incidence / morbidity**

Health is an important part of welfare. Ascites, sudden death syndrome and respiratory diseases (including infectious bronchitis, avian pneumovirus infection and mycoplasmosis) are of great economical and welfare significance in broilers (SCAHAW, 2000).

4.5.1. Ascites / sudden death syndrome (SDS)

4.5.2. Respiratory disease

4.5.3. Parasitic diseases

**4.6. Carcass and meat quality (condemnations)**

At slaughter flocks can be assessed for presence of bruising, broken limbs and injuries. The age of these lesions can help to determine the source (e.g. catching) (Nicol & Scott 1990). Back scratching, hock and feet burns and breast blisters are also easily observed. Other conditions such as ascites, leg deformities, dehydration and disease conditions (e.g. skin Mareks lesions) can be assessed.

**4.7. Behaviour**

Bird behaviour can be a sensitive indicator of welfare.

#### 4.7.1. Human avoidance behaviour

Fearful broilers show avoidance of humans, and this behaviour is seen in flocks where caretakers walk through the house quickly when performing their tasks rather than moving more slowly while interacting with the birds (Cransberg et. al 2000). Fearful birds may be less productive (Hemsworth et al., 1994).

#### 4.7.2. Spatial distribution

It may indicate fear, if birds climb on top of each other, thermal discomfort, if birds huddle, or the existence of areas of wet litter or uneven provision of light, food or water if birds are unevenly distributed.

#### 4.7.3. Panting and wing spreading

Panting and wing spreading indicate heat stress.

#### 4.7.4. Dust bathing

Dustbathing is an intricate body maintenance behaviour performed by many birds, including chickens (Olsson and Keeling, 2005). During a dustbathing bout, chickens work loose material (like litter in bedded systems) through their feathers. Dustbathing helps to keep the feathers in good condition, which in turns helps to maintain body temperature and protect against skin injury. Reduced dustbathing behaviour in the flock may indicate problems with litter or range quality, such as litter or ground that is wet or not friable.

#### 4.7.5. Feather pecking and Cannibalism

Feather pecking and cannibalism are reviewed in Mench and Keeling (2002), Rodenberg and Koene (2004) and Newberry (2004). Feather pecking is the pecking or pulling of the feathers of other birds, and can result in significant feather loss. Cannibalism is the tearing of the flesh of another bird, and can result in severe injury, and even the death of the pecked bird. These are abnormal behaviours with multi-factorial causes that are not usually seen in commercial broiler stocks, although they can occur under some circumstances. Feather pecking may sometimes lead to cannibalism or may occur independently; once started, these problems can spread rapidly through the flock.

#### 4.7.6. Feeding and drinking

Reduced feeding or drinking behaviour can indicate management problems, including inadequate feeder or drinker space or placement, dietary imbalance, poor water quality, or feed contamination. Feeding and drinking behaviour are often depressed when birds are ill, and feeding is also reduced during periods of heat stress.

Annex F (contd)**4.8. Water consumption**

The daily water consumption should be close to the standards in the sheate of daily water consumption, taking in consideration ambient temperature, relative humidity, feed consumption and other related factors

The outcome based measurable: daily water consumption, wet litter, diarrhea, dehydration of the birds and faults in water system.

**4.9. Growth rate**

Growth rate is an index that indicates the average daily gain (gr.) of weight per average broiler of a flock.

**4.10. Feed conversion**

Feed conversion is an index that indicates the quantity of feed (kg.) that is necessary for a gain of bodyweight of 1 kilogram of the average broiler of a flock.

**4.11. Injury rate**

The most frequent injuries seen are bruises, broken limbs and damaged wings. Fractures in broilers were located mainly on femur, radius, ulna, furculum and ischium. Dislocation of the femur at the hip joint is the most common traumatic injury. It may be associated with profuse haemorrhaging and in around one-third of the cases the femur had actually been forced into the brief abdominal cavity.

**4.12. Eye condition:**

Conjunctivitis can indicate the presence of irritants such as dust and ammonia. High ammonia levels will also cause corneal burns and eventual blindness (Morrow 2008:541).

The *ad hoc* Group identified the following outcome based measurables that are relevant but could be difficult to apply/evaluate under practical conditions: Immune response; and Use of drugs/additives.

**5. Recommendations**

The *ad hoc* Group agreed to that reference should be made as appropriate to existing OIE standards, i.e.covering:

- Transport
- Slaughter for human consumption
- Killing for disease control
- Identification and traceability
- Disease surveillance and reporting
- Biosecurity
- Animal feeding
- Use of antimicrobials
- Prevention and eradication of OIE listed diseases

The *ad hoc* Group agreed to make recommendations in regard to the elements listed below.

## 5.1. Biosecurity and Animal Health

### 5.1.1. Biosecurity and disease prevention

Biosecurity means a set of measures designed to protect a flock from the entry of infectious agents (Lister 2008:48-65)

Biosecurity programmes should be implemented, commensurate with the risk of disease and in accordance with relevant recommendations found in *Terrestrial Code* chapters on OIE listed diseases.

These programmes should address the control of the major routes for disease and pathogen transmission:-

- Poultry
- Other animals
- People
- Equipment
- Vehicles
- Air
- Water supply
- Feed

Outcome based measurables: disease incidence, mortality, growth rate and feed conversion.

### 5.1.2. Animal health management / Preventative Medicine / Veterinary Treatment

Animal health management means a system designed to prevent diseases occurring in a flock and provide diagnosis and treatment if disease occurs in order to optimise the health and welfare of the flock.

Those responsible for the care of birds should be aware of the signs of ill-health or distress, such as reduced food and water intake, reduced growth, changes in behaviour, abnormal conditions of their feathers or droppings, or other physical features.

If persons in charge are not able to identify the causes of ill-health or distress or to correct these or suspect the presence of a listed reportable disease, they should seek advice from those having training and experience, such as poultry veterinarians or other qualified advisers. Veterinary treatments should be prescribed by a qualified veterinarian.

There should be an effective programme for the prevention, diagnosis and treatment of diseases consistent with the programs established by the Veterinary Services as appropriate (Bermudez and Stewart-Brown 2008:5-41)

Vaccinations and other treatments administered to chickens should be undertaken with consideration of the welfare of the birds by people skilled in the procedures (Cserep 2008:66-74) (Wages 2008:42-46)

Culling of sick or injured birds should be done in a humane manner as soon as possible. Similarly, killing birds as may be required for diagnostic purposes should be done in a humane manner.

Outcome based measurables: disease incidence, mortality and poor performance.

Annex F (contd)**5.2. Environment**

## 5.2.1. Thermal environment

Extreme thermal environment, particularly heat stress is a major threat to broiler chicken welfare and productivity. During the first and second week of life chicks are susceptible to hypothermia. The risk of hyperthermia increases as birds get bigger, better insulated and consumed more food (Etches et al., 1985). High ambient temperature may depress growth rate, and feed efficiency and immune responses, and increase mortality (Liew et al., 2003; Nwe Nwe Htin et al., 2007). Higher water consumption (to replace evaporative water loss) leads to wetter droppings, wet litter and high ammonia concentration.

Poor litter quality is closely associated with higher incidence of contact dermatitis, leg problems and soiled plumage (Martland, 1984; 1985).

In intensive and semi intensive production systems every attempt should be made to keep thermal conditions within the recommended range.

In extensive production systems appropriate management to mitigate the effects of extreme thermal conditions should be implemented.

The outcome bases measurables are rates of mortality, rate of contact dermatitis, water consumption, feed consumption, growth rate, feed conversion, behaviour.

## 5.2.2. Lighting

To modulate growth, intensively reared broiler chickens are often raised in dim lighting and/or under photoperiods with extremely long day lengths. However, dim lighting and insufficient daily dark periods can have negative effects on certain aspects of bird welfare, particularly with respect to gait and eye health (SCAHAW, 2000; Mench, 2004; Classen et al., 2004; Blatchford et al., 2008). Broilers kept in dim light are less active during the day than those kept in brighter light (Blatchford et al., 2008). When there is low illumination contrast between the light and dark phase of the cycle, broilers are less likely to synchronize their behaviour with one another, and in consequence active birds interrupt the rest of inactive birds (Alvino et al., 2009).

There should be an adequate period of continuous darkness during each 24 hour period to allow the birds to rest.

The light intensity during the light period should be sufficient and homogeneously distributed to allow the chicks to find feed and water in the first few days after they are placed in the house, to stimulate bird activity, and to allow inspection of the birds.

Birds should be gradually adjusted to lighting changes.

Outcome based measurables: lameness, feed and water consumption, behaviour and injuries.

## 5.2.3. Air quality

Air quality is an important factor in intensive and semi-intensive production systems. It is a composite variable of air constituents such as gases, dust and micro-organisms that is strongly influenced by the management of the poultry farmer. The composition is influenced by the stocking density, the age and the activity of the birds, the feed composition, the litter quality and the incoming ventilation air.

Annex F (contd)

Bad air quality is a principal risk factor for respiratory diseases (Versteegen et al. 1994, Hartung 1994).

The temperature and humidity of the air influence the thermal comfort of the birds. The humidity depends on factors in the building, such as the litter moisture, but also on the climate outside (North, 1972).

In a situation with a low relative humidity (< 50%) there is a risk of an increase in dust and airborne microorganisms which may increase susceptibility to respiratory diseases (North, 1972).

In cold climates a high humidity can be a problem because ventilation will not be adequate for reasons relating to the low temperature and can also be a problem under very hot circumstances in a building with heavy chickens (heat stress may result) (North, 1972).

The gasses carbon dioxide (CO<sub>2</sub>) and ammonia (NH<sub>3</sub>) are present in every poultry house. High levels of these gasses should be avoided. A high level CO<sub>2</sub> has a negative effect on the growth of the broilers and a high level of NH<sub>3</sub> can cause respiratory and eye problems (Wilson and Edwards, 1950, Helbacka et al., 1963, Romijn and Lockhorst, 1964, Reece and Lott, 1980) Castelló (1993).

Some other gasses may potentially affect welfare in broilers for example carbon monoxide (CO), hydrogen sulphide (H<sub>2</sub>S), nitrous oxide (N<sub>2</sub>O) and methane (CH<sub>4</sub>) (Bocquier et al. 1999, Tegethoff and Hartung, 1996).

Dust irritates the respiratory tract of broilers, thereby lowering their resistance to diseases playing an important role in the transmission of many infections (Maurer et al., 1998).

Adequate ventilation is required at all times and is one means of controlling temperature and humidity.

Ammonia is a very good indicator of noxious gasses and its concentration should not routinely exceed 25 ppm at bird level.

Dust levels should be kept to a minimum. Methods for doing that can include: maintaining appropriate ventilation and optimal relative humidity levels (50%–80%).

Outcome based measurables: incidence of respiratory diseases, behaviour (panting, huddling), condition of the eyes, growth rate, feed conversion, contact dermatitis, distribution of the birds.

#### 5.2.4. Acoustic environment

There has been limited research on the effects on noise on poultry, but several recent studies have shown that exposing chickens to loud noises (80 dB or more) for short periods of time (10-60 minutes) causes stress responses (Campo et al., 2005; Chloupek et al., 2009). Young broilers may habituate to some extent to loud noises if they are exposed to them continuously (McFarlane and Curtis, 1989; Mc Farlane et al., 1989a, b), but still show stress responses if such noises are presented repeatedly but for relatively short periods during the grow-out period (Lazarevic' et al., 2000). Unfamiliar loud noises may increase fearfulness (Campo et al., 2005), and sudden loud noises can cause fear reactions (Stadelman, 1958; Book and Bradley, 1990) that can result in birds piling on top of and suffocating one another.

Exposure of birds to sudden or loud noises should be minimized where possible to prevent stress and fear reactions (e.g. piling).

Annex F (contd)

Note: location of farms should, where possible, take into account existing environmental conditions.

Outcome based measurables: daily mortality rate, growth rate, food conversion, injuries, fearfulness, behaviour.

## 5.2.5. Nutrition

The energy, protein, amino acid, mineral and vitamin contents of the diet are major factors determining the growth, feed efficiency and body components of broilers. Broilers have an appetite for protein and energy and will regulate food intake to meet their needs for both of these nutrients (Gous, 1998).

Nutritional management can have an impact on the metabolic disorders. Decreasing the early growth of broilers by qualitative or quantitative food restrictions or by providing feed in meals rather than ad libitum can lower the incidences of leg or cardiopulmonary disorders. The use of vitamin D metabolites as dietary additives may have a role in promoting a better development of the bird (Angel R., 2007; Raine, 1986; Proudfoot and Hulan, 1982).

The water quality and the method of supply can affect welfare. A good water system is not only necessary to fulfil the needs of the broilers but also for the quality of the litter.

Birds should be fed a diet containing adequate nutrients to meet their requirements for good health.

Feed and water should be palatable and free from contaminants potentially hazardous to bird health.

Cleaning the water system should be done regularly.

Birds must be provided with adequate accessibility to feed on a daily basis. Water should be available continuously.

Special provisions should be made to enable young chicks to access feed and water.

Outcome based measurables: feed and water consumption, growth rate, food conversion, behaviour, lameness, disease incidence, mortality, morbidity and carcass and meat quality.

## 5.2.6. Flooring, bedding, resting surfaces (litter quality)

Most broilers spend their entire life in contact with litter. Poor litter quality can cause dust and respiratory diseases. Wet litter or litter with a high content of ammonia causes contact dermatitis and litter with a high level of ammonia increases the incidence of ascites. Litter quality is partly related to the type of substrate used and partly to different management practices. The choices of the type of substrate should be made carefully (Shanawany, 1992).

Inadequate feed composition or digestibility problems can result in wet or sticky droppings, which can lead to poor litter quality (Appleby et al. 1992; Tucker and Walker, 1992).

Good litter quality is essential for broiler welfare. Litter should be maintained so that it is friable and not dusty, caked or wet.

The floor of a poultry building should be easy to clean and disinfect. If litter is recycled it should be managed to minimize any detrimental effects on welfare and health. Litter should be replaced when required to control a disease outbreak in the next flock.

Annex F (contd)

In litter based systems before the one day old chicks enter the building the floor should have a bedding of uncontaminated new substrate (e.g. wood shavings, straw, shredded paper) of sufficient depth to elicit normal behaviour and to protect them from the floor.

The floors of cages and slatted systems should be designed, constructed and maintained to adequately support the birds and prevent injuries, insuring that manure is adequately removed.

Day old chicks should be housed on a floor suitable for their size.

Outcome based measurables: contact dermatitis, breast blisters, feather condition, ascites, lameness, behaviour, eye condition, respiratory disease, growth rate.

#### 5.2.7. Social environment

Commercial strains of broilers show little aggression towards one another (Mench, 1988), and are not prone to engage in injurious social behaviours like feather pecking and cannibalism. However, under some management conditions some strains of chickens raised for meat (especially dual-purpose strains), may feather peck or cannibalise one another. Feather pecking and cannibalism are abnormal behaviours. Their causes are multi-factorial, and outbreaks of these behaviours may be associated with nutritional deficiencies, lack of foraging opportunities, rearing conditions, light intensity levels, light colour, genetics, group size, stocking density, and facilities configuration (especially lack of access to perches from an early age) (Mench and Keeling, 2001; Newberry, 2004; Rodenburg and Koene, 2004). Correction of the problems that lead to outbreaks can be effective in preventing these behaviours, or in minimizing their severity. If this is ineffective, trimming the beak reduces damage to other birds, although this procedure has been criticized because it causes short-term, and under some circumstances long-term, pain (Hester and Shea-Moore, 2003; Glatz, 2005).

Management methods (e.g. reducing light intensity, providing foraging materials, nutritional modifications, reducing stocking density) should be implemented to reduce feather pecking and cannibalism in growing systems where these behaviours are a potential problem. If these management strategies fail then therapeutic beak trimming should be considered.

Measurables: injuries, behaviour, feather condition, mortality, carcass and meat quality.

#### 5.2.8. Stocking density

High stocking densities may have an adverse effect on growth rate, feed efficiency, survivability, carcass quality and behaviour (locomotion, resting, preening, feeding and drinking) (Cravener, 1992; Hall, 2001). Contact dermatitis, breast blisters, skeletal problems and soiled plumage can be associated with higher stocking density.

Factors such as ambient conditions, housing systems, production systems, litter quality, biosecurity strategy, selection of genetic stocks, and market age of birds should be taken into account in determining the appropriate stocking density (Estevez, 2007).

Floor space provided should ideally provide comfort, ability to express normal postural adjustments and to be able to access feed and water compatible with their physiological needs.

Annex F (contd)

Outcome based measurables: rates of injuries, rates of contact dermatitis, rates of mortality, behaviour, growth rate, feed conversion, plumage condition, carcass quality.

## 5.2.9. Management of outdoor areas

Management of outdoor areas is important in extensive and semi-intensive production systems. Birds in outdoor areas can be exposed to adverse climatic conditions, predators, poisonous plants and contaminants. Additionally, if birds are kept outdoors for some time without being moved to a new area, the risk of parasitic diseases transmitted by faeces may be high (Löfliger et al., 1981, cited in Broom and Johnson, 2007).

Land (pasture) management measures to reduce the risk of birds being infected by parasites transmitted by faeces should be taken. This might include limiting the stocking density and / or using several pieces of land consecutively (rotation). It is also important that outdoor areas are appropriately managed to minimize swampy conditions and mud. Outdoor areas should be free of poisonous plants and other contaminants.

Particularly in extensive systems where birds do not have access to an indoor area, it is important to provide protection from adverse climatic conditions (e.g. heat, cold, rain).

Protection from predators should be provided.

Outcome based measurables: incidence of parasitic diseases, growth rate, feather condition and mortality rate.

## 5.2.10. Protection from predators

In all systems and particularly in extensive systems where birds have access to outdoor areas, broilers should be protected from predators (Meluzzi, 2008).

Outcome based measurables are: mortality, injuries, lost birds.

**5.3. Management**

## 5.3.1. Genetic selection

The two major objectives in broiler selection are to maximise growth rate and to increase food conversion efficiency. Over the years, the selection for growth rate has been very efficient and has resulted in a marked reduction in the number of days needed to reach slaughter weight. Other traits such as low frequency of leg disorders are likely to be included in the selection index by most breeders (SCAHAW, 2000).

Selection for growth rate and food conversion efficiency has resulted in an increase in the occurrence of several disorders which are major welfare concerns, including leg disorders (Mench, 2004), ascites (Pakdel et al., 2005). These problems induce a mortality rate which is higher in fast growing birds than in slow growing meat type birds. However, the occurrence of these conditions can be very variable across lines selected for rapid growth (SCAHAW, 2000).

A second possible consequence of selection for growth rate and food conversion efficiency has been a change in behaviour, including an increase in feeding rate (Howie et al., 2009) and a reduction in activity (Bizeray et al., 2000).

Welfare and health considerations, in addition to productivity, should be taken into account when choosing a strain for a particular location or production system.

Outcome based measurables: lameness, ascites, SDS, mortality, feed conversion, growth rate.

### 5.3.2. Painful interventions

Commercial broiler chickens are not typically subjected to management practices that cause pain. However, prophylactic beak-trimming may be required in case of outbreaks of feather pecking and cannibalism, as described earlier. Guidelines for beak-trimming to minimize negative impacts on bird health and performance are presented in Glatz and Miao (2005). Only the minimum amount of beak needed to prevent beak re-growth before market age (ideally, only the hook at the end of the upper beak) should be removed, and the trim should be performed so as to prevent subsequent distortion or deformation of the beak. The beak should be cauterized after cutting to minimise bleeding. Trimming at an early age (before 10 days of age; Hester and Shea-Moore, 2003) is preferred to prevent long-term pain, but since feather pecking and cannibalism develop when the birds are somewhat older prophylactic trimming will likely occur after this time.

There is a small specialty market for capons (castrated male broilers). Because the testes of male chickens are located inside the abdominal cavity, this procedure is a major surgery (Jacob and Mather, 2000) that should be performed only by skilled individuals and with measures to minimize pain, injury, and bleeding. The procedure is described in Jacob and Mather (2000).

Painful interventions (e.g. beak trimming, toe trimming, dubbing) are not routinely practiced on broilers however broilers are sometimes caponized for specialty products. Caponisation is done using surgical or chemical procedures.

Surgical caponisation should not be performed without adequate pain and infection control methods and should only be performed by trained and skilled personnel under veterinary supervision.

If therapeutic beak trimming is required, it must be carried out by trained and skilled personnel and care should be taken to remove the minimum amount of beak necessary using a method which minimizes pain and controls bleeding.

### 5.3.3. Handling and inspection

Broilers should be inspected every day. Inspection has three main objectives: to pick up dead birds; to identify sick or injured birds to treat or cull them, and to detect and correct any welfare or health problem in the flock (e.g. related to the supply of feed and water, thermal conditions, ventilation, litter quality). Dead or sick birds may be sampled for the purposes of investigating causes of mortality and illness.

Inspection should be done in such a way that birds are not unnecessarily disturbed, for example personnel should move slowly through the flock.

When birds are handled they should not be injured or unnecessarily frightened or stressed.

Birds with an incurable sickness, significant deformity or injury should be removed from the flock and humanely killed as soon as possible. Cervical dislocation is an acceptable method for killing small numbers of birds if carried out competently (Article 7.6.17. of the *Terrestrial Code*). For a complete description of other killing methods, see Article 7.6.5 of the *Terrestrial Code*.

Annex F (contd)

Outcome based measurables: fear, performance, injuries, mortality, morbidity.

## 5.3.4. Personnel training

All people responsible for the broilers should be competent according to their responsibilities and should understand broiler behaviour, biosecurity, general signs of disease, and indicators of poor animal welfare such as stress, pain and fatigue, and their alleviation.

Competence may be gained through formal training and/or practical experience.

## 5.3.5. Emergency plans

Poultry producers should have contingency plans to cover the failure of power, water and feed supply. These plans may include the provision of fail safe alarm devices to detect malfunctions, back up generators, access to maintenance providers, alternative heating arrangements, ability to store water on farm, access to water cartage services, adequate on farm storage of feed and alternative feed supply and emergency ventilation.

Plans should be in place to minimise and mitigate the effects of natural disasters. Emergency plans should also cover the management of the farm in the face of an emergency disease outbreak, consistent with national programs and recommendations of Veterinary Services as appropriate.

## 5.3.6. Location, construction and equipment of farms

Poultry accommodation should be sited to be safe from the effects of fires and floods and other natural disasters to the extent practical.

The location of the farm should be chosen to avoid or minimize biosecurity risk, exposure of birds to chemical and physical contaminants, noise and adverse climatic conditions.

Buildings should be constructed and electrical and fuel installations should be fitted to minimise the risk of fire and other hazards.

A maintenance programme should be in place to regularly inspect and maintain all equipment supplying important commodities.

## 5.3.7. On farm harvesting

On farm harvesting procedures represent potential risks to broiler chicken welfare. Physical contact with human beings during catching may elicit both stress and fear reactions (Zulkifli et al., 2000; 2004).

Accidental injuries during catching such as bruising, bone fractures and joint dislocation are common problems. The manner in which birds are caught, the number of birds caught simultaneously, and the number of birds carried by the catcher in each hand are factors that may determine the incidence of accidental injuries (Mitchell and Kettlewell, 2004).

Feed should be removed at a suitable time prior to catching. Water should be available for as long as possible.

Injured and sick birds should be culled or separated prior to harvesting.

Catching should be done by skilled workers and every attempt should be made to minimize stress and fear reactions, and injury. The birds should not be picked up by their neck or wings and they should be put in the transport container carefully.

Mechanical catchers should be designed, operated and maintained to minimize injury, stress and fear to the birds. A contingency plan is advisable in case of mechanical failure.

Catching should preferably be carried out under dim or blue light to calm the birds (Prescott et al., 2004).

Catching should be scheduled to minimize the time to slaughter as well as climatic stress during catching, transport and holding.

Stocking density in transport containers should suit climatic conditions and maintain comfort.

Containers should be clean and designed and maintained to avoid injury to the birds.

Outcome based measurables: incidence of injuries, mortality rate, and carcass quality.

#### 5.3.8. Humane killing

Injured and sick birds should be killed humanely. Cervical dislocation is considered a humane method for killing small numbers of birds. For a description of other methods for the humane killing of broilers, see Article 7.6.5. of the *Terrestrial Code*.

## 6. **Future work**

The *ad hoc* Group discussed and agreed on further work that would be needed to support the development of the draft chapter (see Appendix IV).

## 7. **Scientific references**

Adele Meluzzi, Federico Sirri 2008, Welfare of broiler chickens.

Alvino, L.G.M., R.A. Blatchford, G.S. Archer, and J.A. Mench. 2009. Light intensity during rearing affects the behavioural synchrony and resting patterns of broiler chickens. *British Poultry Science* doi: 10.1080/0071660902942775.

Angel, R. 2007. Metabolic disorders: limitations to growth of and mineral deposition into the broiler skeleton after hatch and potential implications for leg problems. *The Journal of Applied Poultry Research* 2007: 16, pp 138–149.

Animal welfare: global issues, trends and challenges – Scientific and technical review 24 (2), 2005.

Appleby, M.C., B.O. Hughes and H.A. Elson, 1992. Poultry production systems: behaviour, management and welfare. Wallingford C.A.B. International, Ocon, UK . pp 238.

Annex F (contd)

- Arnould, C. and L. Colin. 2009. Relationship between various measures used to assess the welfare of broiler chickens on farm. 8<sup>th</sup> European Symposium on Poultry Welfare, Cervia, Italy. World's Poultry Science Journal (abstract book).
- Berg, C. and G.S. Sanotra. 2003. Can a modified latency-to-lie test be used to validate gait-scoring results in commercial broiler flocks? *Animal Welfare* 12, 55–659.
- Bermudez, AJ & Stewart-Brown, B 2008, 'Disease Prevention and Diagnosis', in *Diseases of Poultry*, 12th edn, ed. YM Saif, Blackwell Publishing, pp. 5–42.
- Bizeray D, Leterrier C, Constantin P, Picard M and Faure J M 2000, Early locomotor behaviour in genetic stocks of chickens with different growth rates, *Applied Animal behaviour Science*. 68, 231–242.
- Blatchford, R.A., Klasing, K.C., Shivaprasad, H.L., Wakenell, P.S., Archer, G.S., Mench, J.A. 2009. The effect of light intensity on the behaviour, eye and leg health, and immune function of broiler chickens. *Poultry Science* 88, 20–28.
- Bocquier C., G. Amand, H. Valancony and J.K. Loizea, 1999. Résultats des mesures de monoxide de carbone réalisées dans les élevages avicoles des Pays de la Loire durant l'hiver 1997/1998. *Sciences et Technique Avicoles*, 26, 24–3.
- Book, C.M., F.A. Bradley. 1990. Behavioural effects of simulated F-4D aircraft overflights on Nicholas turkey poults. *Poultry Science* 69 (suppl.), 22.
- Broom D M and Fraser A F *Domestic Animal Behaviour and Welfare*, 4<sup>th</sup> Edition. Wallingford: CAB International, p. 290.
- Campo, J.L., M.G. Gil, S.G. Dávila. 2005. Effects of specific noise and music stimuli on stress and fear levels of laying hens of several breeds. *Applied Animal Behaviour Science* 91, 75–84.
- Castelló, J.A., 1993. Construcciones y equipos avícolas. Real Escuela de Avicultura. Arenys de Mar, Spain, pp 47.
- Chloupek, P., Voslárová, E., Chloupek, J., Bedánová, E., Pišteková, Vecerek, V. 2009. Stress in broiler chickens due to acute noise exposure. *Acta Vet. Brno*. 78, 93–98.
- Classen, H.L., Annett, C.B., Schwean-Lardner, K.V., Gonda, R., Derow, D. 2004. The effects of lighting programmes with twelve hours of darkness per day provided in one, six or twelve hour intervals on the productivity and health of broiler chickens. *British Poultry Science* 45 (Suppl. 1), 31–32.
- Cransberg, P.H., P.H. Hemsworth, G.J. Coleman. 2000. Human factors affecting the behaviour and productivity of commercial broiler chickens. *British Poultry Science*, 41, 272–279.
- Cravener, T. L., W. B. Roush, and M. M. Mashaly. 1992. Broiler production under varying population-densities. *Poultry Science*, 71, 427–433.
- Cserep, T 2008, 'Vaccines and vaccination', in *Poultry Diseases*, 6th edn, eds. M Pattison, P McMullin, J Bradbury, D Alexander, Elsevier, pp.66–74.
- Dawkins, M.S., Donnelly, C.A., and T.A. Jones. 2004. Chicken welfare is influenced more by housing conditions than by stocking density. *Nature*, 427, 342–344.
- Estevez, I. 2007. Density allowances for broilers: where to set the limits? *Poultry Science* 86, 1265–1272.
- Etches, R.J., T.M. John and A.M.V. Gibbins. 1995. Behavioural, physiological, neuroendocrine and molecular responses to heat stress. Pages 31-65 in *Poultry Production in Hot Climates*. N.J. Dagher, ed. CAB International, Wallingford, UK.
- Garner, J.P., C. Falcone, P. Wakenell, M. Martin, and J.A. Mench 2002. Reliability and validity of a modified gait scoring system and its use in assessing tibial dyschondroplasia in broilers. *British Poultry Science*, 43, 355–363.

- Gas mixtures for anaesthesia and euthanasia in broiler chickens, *World's Poultry Science Journal* (2000), 56:226-234 Cambridge University Press, Copyright © Cambridge University Press 2000.
- Glatz, P.C. (2005) *Poultry Welfare Issues: Beak Trimming*. Nottingham University Press, Nottingham, United Kingdom.
- Glatz, P.C. and Miao, Z.H. 2005. Bird health and handling issues associated with beak-trimming. In: Glatz, P.C. (2005) *Poultry Welfare Issues: Beak Trimming*. Nottingham University Press, Nottingham, United Kingdom, pp. 87–92.
- Gous, R.M. 1998. Making progress in the nutrition of broilers. *Poultry Science*, 77, pag. 111–117.
- Hall, A. L. 2001. The effect of stocking density on the welfare and behaviour of broiler chickens reared commercially. *Animal Welfare*, 10, 23–40.
- Hartung, J., 1994. The effect of airborne particulates on livestock health and production. In 1. A.P. Dewi, R.F.E. Axford, I. Fayed, M. Marai, H. Omed (eds.): *Pollution in Livestock Production Systems*, CAB International, Wallingford, UK, pp 55–69.
- Helbacka N.V., J.L. Casterline and C.J. Smith, 1963. The effect of high CO<sub>2</sub> atmosphere on the laying hen. *Poultry Science*, 42, pp 1082–1084.
- Hemsworth, P.H., Coleman, J.G., Barnett, J.L., Jones, R.B 1994. Behavioural responses of humans and the productivity of commercial broiler chickens. *Applied Animal Behaviour Science*, 41, 101–114.
- Hester, P.Y. and Shea-Moore, M. (2003) *Beak trimming egg-laying strains of chickens* *World's Poultry Science Journal*, 59, 458–474.
- Howie J A, Tolkamp B J, Avendano S and Kyriazakis I 2009 The structure of feeding behaviour in commercial broiler lines selected for different growth rates *Poultry Science*, 88, 1143–1150.
- Humane Killing of Nonhuman Animals for Disease Control Purposes, *Journal of Applied Animal Welfare Science*, 1532-7604, Volume 11, Issue 2, 2008, Pages 112–124.
- Jacob, J. and F.B. Mather. 2000. Capons. Extension Fact Sheet PS-54. Institute of Food and Agricultural Sciences, University of Florida. <http://edis.ufl.edu>
- Kestin, S.C., T.G. Knowles, A.E. Tinch, and N.G. Gregory. 1992. Prevalence of leg weakness in broiler chickens and its relationship with genotype. *Veterinary Record*, 131, 190–194.
- Lazarevic', M. D. Zikiz', G. Ušc'ebra. 2000. The influence of long term sound stress on the blood leucocyte count, heterophil/lymphocyte ratios and cutaneous basophil hypersensitive reaction to phytohaemagglutinin in broiler chickens. *Acta. Vet. Beograd.*, 50, 63–75.
- Liew, P.K., I. Zulkifli, M. Hair-Bejo, A.R. Omar and D.A. Israf. 2003. Effects of early age feed restriction and thermal conditioning on heat shock protein 70 expression, resistance to infectious bursal disease and growth in male broiler chickens subjected to chronic heat stress. *Poultry Science*, 82, 1879–1885.
- Lister, S 2008, 'Biosecurity in poultry management', in *Poultry Diseases*, 6th edn, eds. M Pattison, P McMullin, J Bradbury, D Alexander, Elsevier, pp. 48–65.
- Löliger H C, vom dem Hagen D and Matthes S 1981 Einfluss der haltungssysteme auf die tiergesundheit bericht über ergebnisse klinishpathologischer untersuchungen. *Landbauforschung Völkenrode*, 60, 47–67.
- Martland, M.F. 1984. Wet litter as a cause of plantar pododermatitis, leading to foot ulceration, and lameness in fattening turkeys. *Avian pathology*, 13, 241–152.
- Martland, M.F. 1985. Ulcerative dermatitis in broiler chickens: the effects of wet litter. *Avian Pathology*, 14, 353–364.
- Maurer J.J., T.P. Brown, W.L. Steffens and S.G. Thayer, 1998. The occurrence of ambient temperature-regulated adhesins, curli, the temperature-sensitive hemagglutinin tsh among avian *Escherichia coli*. *Avian Diseases*, 42, pp 106–118.

Annex F (contd)

- McFarlane, J.M., S.E. Curtis, R.D. Shanks, S.G. Carmer. 1989a. Multiple concurrent stressors in chicks. 1. Effect on weight gain, feed intake, and behaviour. *Poultry Science*, 68, 501–509.
- McFarlane, J.M., S.E. Curtis, J. Simon, O.A. Izquierdo. 1989b. Multiple concurrent stressors in chicks. 2. Effects on hematologic, body composition, and pathology traits. *Poultry Science*, 68, 510–521.
- McFarlane, J.M., S.E. Curtis. 1989. Multiple concurrent stressors in chicks. 3. Effects on plasma corticosterone and the heterophil:lymphocyte ratio. *Poultry Science*, 68, 522–527.
- Mench J 2009 *Lameness IN: C A Weeks and A Butterworth (Eds.) Measuring and auditing broiler welfare* Wallingford: CABI, pp. 3–18.
- Mench, J.A. 2004. Lameness. In: *Measuring and Auditing Broiler Welfare*, eds. C.A. Weeks and A. Butterworth. CABI, Wallingford, U.K., pp. 3–18.
- Mench, J.A. and Keeling, L.J. 2001. The social behaviour of domestic birds. In *Social Behaviour in Farm Animals*, ed. L.J. Keeling and H. Gonyou. CAB International, Wallingford, Oxon, UK, p. 177–210.
- Mench, J.A., 1988. The development of aggressive behaviour in male broiler chicks: A comparison with laying-type males and the effects of feed restriction. *Applied Animal Behaviour Science*, 21, 233–242.
- Mitchell M.A. and P.J. Kettlewell. 2004. Transport and handling. Pages 249-267 in *Measuring and Auditing Broiler Welfare*. C.A. Weeks and A. Butterworth, eds. CABI Publishing, Wallingford, UK.
- Morrow, C 2008, 'Management as a cause of disease in poultry', in *Poultry Diseases*, 6th edn, eds. M Pattison, P McMullin, J Bradbury, D Alexander, Elsevier, pp 536–547.
- Newberry, R.C. Cannibalism. 2004. In: *Welfare of the Laying Hen*, ed. G.C. Perry. Wallingford, UK, CABI Publishing, pp. 227–238.
- Nicol, CJ & Scott, GB 1990, 'Pre-slaughter handling and transport of broiler chickens', *Applied Animal Behaviour Science*, vol. 28, pp. 57–73.
- North M.O., 1972. Commercial chicken production manual. The Avi Publishing Company Westport, Connecticut, USA, pp 136–138.
- Nwe Nwe Htin, I. Zulkifli, M. Hair-Bejo, A.R. Omar, A. R. Alimon and T.C Loh. 2007. Effects dietary linoleic and linolenic fatty acids on immune response and resistance to infectious bursal disease in broiler chickens under heat stress conditions. *Archive für Geflügelkunde*, 71, 258–266.
- OIE *International Terrestrial Animal Health Code*, 2008.
- Olsson, A. and L.J. Keeling. 2005. Why in earth? Dustbathing behaviour in junglefowl and domestic fowl reviewed from a Tinbergian and animal welfare perspective. *Applied Animal Behaviour Science*, 93, 259–282.
- Pakdel A, Bijma P, Ducro B J and Bovenhuis H 2005 Selection strategies for body weight and reduced ascites susceptibility in broilers *Poultry Science*, 84, 528–535.
- Prescott, N.B., H.H. Kristensen and C.M. Wathes. 2004. Light. Pages 101-116 in *Measuring and Auditing Broiler Welfare*. C.A. Weeks and A. Butterworth, eds. CABI Publishing, Wallingford, UK.
- Proudfoot, F.G. and H.W. Hulan, 1982. Effects of reduced feeding time using all amsh or crumblepellet dietary regimes on chicken broiler performance, including the incidence of acute death syndrome. *Poultry Sciences*, 61, pp 750–754.
- Raine, H, 1986. Manipulating broiler growth curve improves profitability. *Poultry International*, March 1986, pp 82–84.

Annex F (contd)

- Reece F.N. and B.D. Lott, 1980. Effect of carbon dioxide on broiler chickens performance. *Poultry Sciences*, 59, pp 2400–2402.
- Rodenburg, T.B. and Koene, P. 2004. Feather pecking and feather loss. In: *Welfare of the Laying Hen*, ed. G.C. Perry. Wallingford, UK, CABI Publishing, pp. 227–238.
- Romijn C. and W. Lockhorst, 1964. Physiological aspects of ventilation in poultry houses. II European Breeders Limited. Midlothian, UK.
- RSPCA. 2008. Welfare standards for chickens. Royal Society for Prevention of Cruelty to Animals. <http://www.rspca.org.uk/servlet/Satellite?blobcol=urloblob&blobheader=application%2Fpdf&blobkey=id&blobtable=RSPCABlob&blobwhere=1158755026986&ssbinary=true>.
- Sanotra, G. S., L. G. Lawson, and K. S. Vestergaard. 2001. Influence of stocking density on tonic immobility, lameness, and tibial dyschondroplasia in broilers. *Journal of Applied Animal Welfare Science*, 4, 71–87.
- Scientific Committee on Animal Health and Animal Welfare, European Commission 2000 *The Welfare of Chickens Kept for Meat production (Broilers)*.
- Shanawany M.M., 1992. Influence of litter water-holding capacity on broiler weight and carcass quality. *Archiv für Geflügelkunde*, 56, 177–179.
- Sørensen, P., G. Su, and S. C. Kestin. 2000. Effects of age and stocking density on leg weakness in broiler chickens. *Poultry Science*, 79, 864–870.
- Stadelmen, W.J. 1958. Observations with growing chickens on the effects of sounds of varying intensities. *Poultry Science*, 37, 776–779.
- Tegethoff V. and J. Hartung, 1996. A field-study on stocking density and air-quality in broiler production and recommendations to avoid heat-stress in summer. *Deutsches Tierärztliches Wochenschrift*, 103, pp 87–91.
- Tucker S.A. and A.W. Walker, 1992. Hock burg in broilers. Recent advance in animal nutrition. Oxford: Butterworth Heinemann Ltd., pp 33–50.
- Versteegen M., S. Tamminga, and R. Geers, 1994. The effect of gaseous pollutants on animals. In: 1 A.P. Dewi, R.F.E. Axford, I. Fayez, M. Marai, H. Omed (eds.): *Pollution in Livestock Production Systems*, CAB International, Wallingford, UK, pp. 71–79.
- Wages, DP 2008, 'Disease Prevention and Diagnosis', in *Diseases of Poultry*, 12th edn, ed. YM Saif, Blackwell Publishing, pp. 42–46.
- Webster, A.B., Fairchild, B.D., Cummings, T.S., Stayer, P.A. 2008. Validation of a three-point gait scoring system for field assessment of walking ability of commercial broilers. *Journal of Applied Poultry Research*, 17, 529–539.
- Weeks, C.A., T.G. Knowles, R.G. Gordon, A.E. Kerr, S.T. Payton, and N.T. Tilbrook. 2002. New method for objectively assessing lameness in broiler chickens. *Veterinary Record*, 151, 762–764.
- Wilson, W.O. and W.H. Edwards, 1950. Temperature, oxygen and carbon dioxide inside chick boxes at various room temperatures. *Poultry Sciences*, 29, pp 852–857.
- Zulkifli, I. and A. Siti Nor Azah. 2004. Fear and stress reactions, and the performance of commercial broiler chickens subjected to regular pleasant and unpleasant contacts with human beings. *Applied Animal Behaviour Science*, 88, 77–87.
- Zulkifli, I., M.T. Che Norma, C.H. Chong and T.C. Loh. 2000. Heterophil/lymphocyte and tonic immobility reactions to pre-slaughter handling in broiler chickens treated with ascorbic acid. *Poultry Science*, 79, 402–406.

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.../Appendices



**AD HOC GROUP ON ANIMAL WELFARE AND BROILER CHICKEN PRODUCTION SYSTEMS**

**Paris, 15–17 June 2009**

**List of participants**

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Annex F (contd)

Appendix I (contd)

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**AD HOC GROUP ON ANIMAL WELFARE AND BROILER CHICKEN PRODUCTION SYSTEMS****Paris, 15–17 June 2009**  

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**Adopted Agenda**

1. Welcome and introduction – Dr. Sarah Kahn
  2. Confirmation of Terms of Reference and comments from Chair of the *ad hoc* Group
  3. Discussion of working documents and other relevant documents provided by the *ad hoc* Group Members
  4. Development standards
  5. Review and finalise report of meeting
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**AD HOC GROUP ON ANIMAL WELFARE AND BROILER CHICKEN PRODUCTION SYSTEMS****Paris, 15–17 June 2009**

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**Terms of Reference**

Taking into account:

1. the recommendations of the OIE *ad hoc* group on animal welfare and livestock production (report of meeting held 8-10 April 2008) and
2. the existing animal welfare and animal health standards in the Terrestrial Animal Health Code (the *Code*):

Elaborate draft animal welfare standards for broiler chicken production for eventual inclusion in the *Code*.

These standards should cover, *inter alia*:

- a) appropriate definitions;
  - b) housing;
  - c) feeding and watering of the animals;
  - d) environmental considerations;
  - e) management of endemic and emerging diseases;
  - f) prevention of major infectious diseases (biosecurity) and planning for managing disease outbreaks;
  - g) prevention and control of other diseases
  - h) emergency management plans (e.g. disease outbreak, failure of electrical systems, fire, etc.);
  - i) handling facilities (on farm only – transport and slaughter are covered elsewhere in the *Code*).
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## DRAFT CHAPTER X.X.X.

**ANIMAL WELFARE AND BROILER CHICKEN  
PRODUCTION**

Article X.X.1.

**Definitions**Broiler

Birds of the species *Gallus gallus* kept primarily for commercial meat production.

Cage housing system

In a cage housing system the caretaker accesses the birds from outside the enclosure in which the birds are kept.

Deep litter housing system

In a deep litter housing system the birds are kept on floors that are covered with bedding material.

Slatted floor housing system

In a slatted floor housing system the birds are kept on raised floors, on which droppings don't accumulate but fall through.

Article X.X.2.

**Scope**

These recommendations cover the production period from arrival of the chick on the farm to harvesting the broiler in commercial production systems. Backyard flocks are not included even if the animals or products are traded locally.

Note 1: Welfare of the broiler during transport to the abattoir is covered in Chapters 7.2, 7.3 and 7.4.

Note 2: Recommendations on the management of the breeding flock and hatchery and for the period between hatching and arrival on the farm to be developed.

Article X.X.3.

**Commercial broiler production systems**

Commercial broiler production systems include:

1. Intensive systems

Birds are completely confined in a roofed structure, with or without environmental control and usually at a higher stocking density than in other production systems. Birds may be kept in cages (e.g. wire or plastic floor or deep litter floor) or on deep litter, slatted floor or a combination

Annex F (contd)Appendix IV (contd)2. Semi intensive systems

Birds are confined in a roofed structure but provided with an access to a restricted outdoor area. They may be kept in cages (e.g. wire or plastic floor or deep litter floor) or on deep litter, a slatted floor or a combination of the two.

3. Extensive systems

Birds are not confined in a roofed structure and are usually kept at a lower stocking density than in intensive or semi intensive systems.

Article X.X.4.

**Criteria or measurables for the welfare of broilers**

The following outcome (animal) based measurables can be useful indicators of welfare

1. Mortality rate (dead, culled)
2. Gait
3. Contact dermatitis
4. Feather condition
5. Disease incidence / morbidity rates
6. Ascites / sudden death syndrome (SDS)
7. Respiratory disease
8. Parasitic diseases
9. Carcass and meat quality (condemnations)
10. Behaviour: fear, thermal distress, illness
  - a) Human avoidance behaviour
  - b) Spatial distribution:
  - c) Panting and wing spreading.
  - d) Dust bathing
  - e) Feather pecking
  - f) Cannibalism
  - g) Feeding and drinking
11. Water consumption
12. Growth rate

Annex F (contd)Appendix IV (contd)

13. Feed conversion
14. Injury rate
15. Eye condition

Article X.X.5.

**Recommendations**1. Biosecurity and animal health

## a) Biosecurity and Disease Prevention

Biosecurity means a set of measures designed to protect a flock from the entry of infectious agents.

Biosecurity programmes should be implemented, commensurate with the risk of disease and in accordance with relevant recommendations found in *Terrestrial Code* chapters on OIE listed diseases.

These programmes should address the control of the major routes for disease and pathogen transmission:

- Poultry
- Other animals
- People
- Equipment
- Vehicles
- Air
- Water supply
- Feed

Outcome based measurables: disease incidence, mortality, growth rate and feed conversion.

## b) Animal Health Management / Preventive Medicine / Veterinary Treatment

Animal health management means a system designed to prevent diseases occurring in a flock and provide treatment if disease occurs in order to optimise the health and welfare of the flock.

Those responsible for the care of birds should be aware of the signs of ill-health or distress, such as reduced food and water intake, reduced growth, changes in behaviour, abnormal conditions of their feathers or droppings, or other physical features.

Annex F (contd)Appendix IV (contd)

If persons in charge are not able to identify the causes of ill-health or distress or to correct these or suspect the presence of a listed reportable disease, they should seek advice from those having training and experience, such as poultry veterinarians or other qualified advisers. Veterinary treatments should be prescribed by a qualified veterinarian.

There should be an effective programme for the prevention and treatment of diseases consistent with the programs established by the Veterinary Services as appropriate.

Vaccinations and other treatments administered to chickens should be undertaken with consideration of the welfare of the birds by people skilled in the procedures.

Culling of sick or injured birds should be done in a humane manner as soon as possible. Similarly, killing birds as may be required for diagnostic purposes should be done in a humane manner.

Outcome based measurables: disease incidence, mortality and poor performance.

2. Environment

## a) Thermal environment

In intensive and semi intensive production systems every attempt should be made to keep thermal conditions within the recommended range.

A table of recommended ranges will be included

In extensive production systems appropriate management to mitigate the effects of extreme thermal conditions should be implemented.

Outcome based measurables: rates of mortality, rate of contact dermatitis, water consumption, feed consumption, growth rate, feed conversion and behaviour.

## b) Lighting

There should be an adequate period of continuous darkness during each 24 hour period to allow the birds to rest.

The light intensity during the light period should be sufficient and homogeneously distributed to allow the chicks to find feed and water in the first few days after they are placed in the house, to stimulate bird activity, and to allow inspection of the birds.

Birds should be gradually adjusted to lighting changes.

Outcome based measurables: lameness, feed and water consumption, behaviour and injuries.

## c) Air quality

Adequate ventilation is required at all times to provide fresh air and is one means of controlling temperature and humidity.

Ammonia concentration should not routinely exceed 25 ppm at bird level.

Dust levels should be kept to a minimum. Methods for doing that can include: maintaining appropriate ventilation and optimal relative humidity levels (50% - 80%).

Annex F (contd)Appendix IV (contd)

Outcome based measurables: incidence of respiratory diseases, behaviour (panting, huddling), condition of the eyes, growth rate, feed conversion, contact dermatitis, distribution of the birds.

## d) Acoustic environment

Exposure of birds to sudden or loud noises should be minimized where possible to prevent stress and fear reactions (e.g. piling).

Note: location of farms should, where possible, take into account existing environmental conditions.

Outcome based measurables: daily mortality rate, growth rate, food conversion, injuries, fearfulness and behaviour.

## e) Nutrition

Birds should be fed a diet containing adequate nutrients to meet their requirements for good health.

Feed and water should be palatable and free from contaminants potentially hazardous to bird health.

Cleaning the water system should be done regularly.

Birds must be provided with adequate accessibility to feed on a daily basis. Water should be available continuously.

Special provisions should be made to enable young chicks to access feed and water.

Outcome based measurables: feed and water consumption, growth rate, food conversion, behaviour, lameness, disease incidence, mortality, morbidity and carcass and meat quality.

## f) Flooring, bedding, resting surfaces (litter quality)

The floor of a poultry building should be easy to clean and disinfect.

If litter is recycled it should be managed to minimize any detrimental effects on welfare and health. Litter should be replaced when required to control a disease outbreak in the next flock.

Day old chicks should be housed on a floor suitable for their size.

If housed on litter based systems, before the one day old chicks enter the building the floor should have a bedding of uncontaminated new substrate (e.g. wood shavings, straw, shredded paper) of sufficient depth to elicit normal behaviour and to protect them from the floor.

Litter quality is partly related to the type of substrate used and partly to different management practices. The type of substrate should be chosen carefully. Litter should be maintained so that it is friable and not dusty, caked or wet.

The floors of cages and slatted systems should be designed, constructed and maintained to adequately support the birds and prevent injuries and to ensure that manure can be adequately removed.

Annex F (contd)Appendix IV (contd)

Outcome based measurables: contact dermatitis, breast blisters, feather condition, ascites, lameness, behaviour, eye condition, respiratory disease and growth rate.

## g) Social environment

Management methods (e.g. reducing light intensity, providing foraging materials, nutritional modifications, reducing stocking density) should be implemented to reduce feather pecking and cannibalism in growing systems where these behaviours are a potential problem.

If these management strategies fail, therapeutic beak trimming should be considered.

Outcome based measurables: injuries, behaviour, feather condition, mortality, carcass - and meat quality.

## h) Stocking density

Broiler chickens should be housed in an acceptable stocking density.

To determine the appropriate stocking density, the following factors should be taken into account: ambient conditions, housing systems, production systems, litter quality, biosecurity strategy, selection of genetic stocks, and market age of birds should be taken into account so that the floor space provided will ensure good welfare (comfort, ability to express normal postural adjustments and to access feed and water).

Outcome based measurables: rates of injuries, rates of contact dermatitis, rates of mortality, behaviour, growth rate, feed conversion, plumage condition and carcass quality.

## i) Outdoor areas

Management of outdoor areas is important in extensive and semi-intensive production systems.

Land (pasture) management measures should be taken to reduce the risk of birds being infected by parasites transmitted. This might include limiting the stocking density and / or using several pieces of land consecutively (rotation).

Outdoor areas should be managed appropriately to minimize swampy conditions and mud.

Outdoor areas should be managed appropriately to ensure that they are free of poisonous plants and other contaminants.

Particularly in extensive systems where birds do not have access to an indoor area, protection from adverse climatic conditions (e.g. heat, cold, rain) should be provided

Outcome based measurables: incidence of parasitic diseases, growth rate, feather condition and mortality rate.

## j) Protection from predators

Broilers should be protected from predators.

Outcome based measurables: mortality and injuries.

### 3. Management

#### a) Genetic selection

Welfare and health considerations, in addition to productivity, should be taken into account when choosing a strain for a particular location or production system.

Outcome based measurables: lameness, ascites, sudden death syndrome (SDS), mortality, feed conversion and growth rate.

#### b) Painful interventions

Commercial broiler chickens are not typically subjected to management practices that cause pain. However, prophylactic beak-trimming may be required in case of outbreaks of feather pecking and cannibalism, as described earlier. Guidelines for beak-trimming to minimize negative impacts on bird health and performance are presented in Glatz and Miao (2005). Only the minimum amount of beak needed to prevent beak re-growth before market age (ideally, only the hook at the end of the upper beak) should be removed, and the trim should be performed so as to prevent subsequent distortion or deformation of the beak. The beak should be cauterized after cutting to minimise bleeding. Trimming at an early age (before 10 days of age; Hester and Shea-Moore, 2003) is preferred to prevent long-term pain, but since feather pecking and cannibalism develop when the birds are somewhat older prophylactic trimming will likely occur after this time.

There is a small specialty market for capons (castrated male broilers). Because the testes of male chickens are located inside the abdominal cavity, this procedure is a major surgery (Jacob and Mather, 2000) that should be performed only by skilled individuals and with measures to minimize pain, injury, and bleeding. The procedure is described in Jacob and Mather (2000).

Painful interventions (e.g. beak trimming, toe trimming, dubbing) should not be routinely practiced on broilers.

If therapeutic beak trimming is required, it should be carried out by trained and skilled personnel and care should be taken to remove the minimum amount of beak necessary using a method which minimizes pain and controls bleeding.

Surgical caponisation should not be performed without adequate pain and infection control methods and should only be performed by trained and skilled personnel under veterinary supervision.

#### c) Handling and inspection

Broilers should be inspected every day. This inspection should have three main objectives: to pick up dead birds; to identify sick or injured birds to treat or cull them, and to detect and correct any welfare or health problem in the flock (e.g. related to the supply of feed and water, thermal conditions, ventilation, litter quality).

Inspection should be done in such a way that birds are not unnecessarily disturbed, for example personnel should move quietly and slowly through the flock.

When birds are handled they should not be injured or unnecessarily frightened or stressed.

Birds which have an incurable sickness, significant deformity or injury should be removed from the flock and humanely killed as soon as possible.

Annex F (contd)Appendix IV (contd)

Cervical dislocation is an acceptable method for killing small numbers of birds if carried out competently. For a complete description of killing methods see Article 7.6.17. of the *Terrestrial Code*.

Outcome based measurables: fear, performance, injuries, mortality and morbidity.

## d) Personnel training

All people responsible for the broilers should be competent according to their responsibilities and should have sufficient knowledge of broiler behaviour, biosecurity, general signs of disease, and indicators of poor animal welfare such as stress, pain and fatigue, and their alleviation.

## e) Emergency Plans

Poultry producers should have emergency plans to minimize and mitigate the consequences of: natural disasters, disease outbreaks and the failure of mechanical equipment. Planning may include the provision of fail safe alarm devices to detect malfunctions, back up generators, access to maintenance providers, alternative heating arrangements, ability to store water on farm, access to water cartage services, adequate on farm storage of feed and alternative feed supply and emergency ventilation.

An emergency plan for animal health should be developed consistent with national programs established or recommended by Veterinary Services as appropriate.

## f) Location, construction and equipment of farms

The location of poultry farms should be chosen to be safe from the effects of fires and floods and other natural disasters to the extent practical. In addition farms should be sited to avoid or minimize biosecurity risks, exposure of birds to chemical and physical contaminants, noise and adverse climatic conditions.

Housing and equipment to which poultry have access should be designed and maintained to avoid injury or pain to the birds.

Buildings should be constructed and electrical and fuel installations should be fitted to minimise the risk of fire and other hazards.

Poultry producers should have a maintenance programme in place for all equipment that, in case of failure, can jeopardize broiler welfare.

## g) On farm harvesting

Feed should be removed at a suitable time prior to catching.

Water should be available for as long as possible.

Injured and sick birds should be culled or separated prior to harvesting.

Catching should be done by skilled workers and every attempt should be made to minimize stress and fear reactions, and injury.

The broilers should not be picked up by their neck or wings.

The broilers should be put in the transport container carefully.

Annex F (contd)

Appendix IV (contd)

Mechanical catchers should be designed, operated and maintained to minimize injury, stress and fear to the birds. Contingency plan is advisable in case of mechanical failure.

Catching should preferably be carried out under dim or blue light to calm the birds.

Catching should be scheduled to minimize the time to slaughter as well as climatic stress during catching, transport and holding.

Stocking density in transport containers should suit climatic conditions and maintain comfort.

Containers should be clean and disinfected and designed and maintained to avoid injury to the birds.

Outcome based measurables: incidence of injuries, mortality rate and carcass quality.

h) Humane killing

Injured and sick birds should be killed humanely.

Cervical dislocation is considered a humane method for killing small numbers of birds.

For a description of other methods for the humane killing of broilers see Article 7.6.5. of the *Terrestrial Code*.

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