

Transport of animals by sea

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Summary

The author briefly describes the development of the World Organisation for Animal Health (OIE) Guidelines for the transport of animals by sea. The paper provides details about the membership of the OIE *Ad hoc* Group on the sea transport of animals, the terms of reference of this group, the process followed and the consultations that were undertaken in developing and reviewing the guidelines. An outline of the guideline contents is also provided.

In addition, the author outlines the programme of research undertaken into the causes of sheep and cattle deaths during sea transport from Australia – the world's largest exporter of sheep and cattle by sea. The main findings of these investigations are summarised.

Keywords

Animal welfare – Livestock exports – Sea transport guidelines – Sea transport of animals.

Introduction

Animals have been transported by sea, as well as across lakes and rivers, for centuries. The main reason for transporting animals by sea is to satisfy a commercially-driven demand which usually involves breeding, immediate slaughter, or feeding and subsequent slaughter.

The transport of animals by sea is undertaken in many areas of the world, for example:

a) The Middle East region, particularly Saudi Arabia and other countries on the Arabian Peninsula, is the world's largest importer of live animals for slaughter and imports mainly sheep as well as goats, cattle and camels. Sheep, and often cattle as well, may be transported on large ships with purpose-built pens from countries such as Australia, New Zealand, Uruguay, Argentina and the People's Republic of China. However, considerable numbers of sheep and other animals are imported on dhows or other small boats from countries closer to the region such as Somalia, Sudan, India and Pakistan.

b) Each year countries in South-East Asia including Indonesia, the Philippines and Malaysia import thousands of young, tropically-adapted cattle from northern Australia

for feeding and eventual slaughter. This trade developed during the 1990s to satisfy a growing demand for beef and to take advantage of Australia's production capacity as well as the low labour costs and wide availability of feedstuffs in the importing countries.

c) Large numbers of cattle and sheep have been transported on relatively short voyages from the United Kingdom and the Republic of Ireland to continental Europe, mostly for slaughter.

d) As part of its modernisation programme, the People's Republic of China has recently begun importing dairy cattle to satisfy a growing demand for dairy products, and thousands of pregnant heifers and young cows are imported from various parts of the world. Significant numbers of goats and sheep are also imported by the People's Republic of China for breeding with local animals to improve meat and wool production.

There have been concerns about the welfare of animals transported by sea for many years. The unfortunate incident involving 57,000 Australian sheep stranded aboard the livestock transport ship MV Cormo Express for more than two months in 2003 after the shipment was rejected by Saudi Arabia, focused worldwide media attention on the welfare of animals transported by sea.

Against this background, it was timely that the World Organisation for Animal Health (OIE) became involved in developing international guidelines for the welfare of animals. In 2002, the OIE identified four areas of animal welfare for priority attention. One of the priority areas was the sea transport of animals.

Sea transport guidelines

In 2003, the OIE convened an *ad hoc* group on the sea transport of animals with the following terms of reference:

- to develop a first draft of guiding principles specifically addressing sea transportation, based on the generic OIE guiding principles and policies for animal welfare
- to develop a final draft of guidelines (based on approved guiding principles) for consideration by the OIE Working Group on Animal Welfare and the OIE Terrestrial Animal Health Standards Commission
- to review existing standards in the OIE *Terrestrial Animal Health Code*
- to identify future directions in which the *Ad hoc* Group may need to move
- to address the welfare of cattle, sheep, goats, pigs and horses initially.

The first meeting of the *Ad hoc* Group was held in November 2003 and consisted of Dr R.T. Norris (chairman), Dr G.B. (Ru) Davis, Mr T. Harris and Dr M. Kassab as well as Dr D. Wilson and Dr A. Petrini from the OIE. Dr A. Thiermann and Dr A. Gavinelli joined the group for the second meeting in September 2004.

The collective expertise of the group included: clinical experience of sheep and cattle on more than 20 sea voyages; research into the health and welfare of sheep and cattle during sea transport; the planning and supervision of many transport journeys involving many animal species; and experience of regulatory issues from the perspectives of an exporting and an importing country.

An important assumption made at the initial meeting was that the decision to allow the export of animals has already been made by the Governments of the exporting and the importing countries involved.

Other factors taken into consideration were:

- the animals may be transported by sea for slaughter, breeding or other purposes
- the sea journey may involve a short or long distance
- the animals may experience a major change in climate if crossing the equator (e.g. winter conditions in one hemisphere, summer conditions in the other hemisphere)

- there may be many parties in the export chain and several changes in ownership of the animals.

A further consideration was that the Guidelines should be equally applicable throughout the world, including in developing countries.

The following documents were used as sources of information for the initial meeting:

- Animal Transport Association *Manual for the Transportation of Live Animals* (1)
- *Australian Livestock Export Standards* (3)
- Australian Maritime Safety Authority Marine Orders Part 43 (2)
- *European Convention for the protection of animals during international transport* (7).

At its second meeting, the *Ad hoc* Group considered the report of the recent meeting of the OIE Working Group on animal welfare, the outcomes of the OIE Global Conference on Animal Welfare in 2004, the outcomes of the OIE 72nd General Session and comments from Member Countries, from the International Coalition for Farm Animal Welfare and from the European Community Shipowner's Association. Also considered where relevant were the guidelines and standards from the new Australian Standards for the Export of Livestock (5) which was under development at the time.

The Guidelines for the sea transport of animals consist of articles which address the following areas:

- responsibilities
- competence
- documentation
- planning the journey
- pre-journey period
- loading
- journey
- unloading and post-journey handling
- refusal to import.

A brief outline of each of the articles is given below. The full details are now publicly available after the Guidelines were endorsed by OIE Member Countries during the 73rd OIE General Session in May 2005 (17).

Responsibilities

An important principle is that once the decision to transport animals by sea has been made, the welfare of

animals during their transport is paramount and is the joint responsibility of all people involved. The Guidelines identify the main parties involved in the sea transport of animals and outline their responsibilities.

The most important of these parties is the exporter who has overall responsibility for the organisation, carrying out and completion of the journey, regardless of whether duties are subcontracted to other parties during transport. The exporter is also responsible for ensuring compliance of the animals with the veterinary certification and other requirements of the importing and exporting countries, and for the presence during the journey of at least one animal handler competent for the species being transported.

The managers of facilities that are used during the loading of the animals and unloading at the end of the journey have several responsibilities, including the provision of suitable premises and the provision of competent animal handlers. The competent authority of the exporting country and of the importing country also have several responsibilities, including: establishing minimum standards for animal welfare; approving facilities; setting competence standards; ensuring that the vessel transporting the animals meets the required standards; and monitoring and evaluating health and welfare performance.

Competence

The Guidelines focus on the competence of animal handlers and of exporters as these are seen as key parties in ensuring the health and welfare of the animals being transported. Assessment of competence should consider the knowledge, and the ability to apply that knowledge, in several areas, including:

- responsibilities
- sources of advice and assistance
- animal behaviour
- general signs of disease and indicators of poor animal welfare
- relevant authorities and transport regulations
- animal handling methods
- methods of inspecting animals
- appropriate record-keeping.

The Guidelines focus on competence rather than training because a person may be trained but still not be competent. It is recognised that competence may be gained through formal training and/or practical experience.

Documentation

The Guidelines outline the minimum information that should be recorded. This information, which should accompany the consignment, includes:

- the journey travel plan
- details of loading and the stocking density for each load in the consignment
- the daily record of inspection and important events during the journey
- details of the animals and their identification
- details of any treatments administered as well as any deaths.

Planning the journey

Planning the journey adequately is regarded as key to a successful animal health and welfare outcome.

Pre-journey period

Before the journey begins, planning should address the following areas at a minimum:

- the type of vessel required
- the journey route, including distance
- expected weather and sea conditions
- daily care and management of the animals
- provision of appropriate equipment and medication
- provision of sufficient feed and water
- emergency response procedures.

The Guidelines outline several issues relating to the type of vessel, including:

- ensuring that the vessel design and fittings are appropriate for the species of animals to be transported
- the provision of non-slip flooring
- the management of urine and faeces, including prevention of soiling on lower decks
- ensuring adequate access to feed and water
- ensuring that ventilation is adequate to meet variations in climate and the thermo-regulatory needs of the animals
- the general state of maintenance of the vessel.

Special mention is made of road vehicles on roll-on/roll-off vessels and containers, including the need to adequately secure road vehicles and containers before the start of the sea journey to prevent them being displaced.

Planning the journey also includes provision of 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.

The pre-journey period covers the period from selection of the animals at the premises of origin to the point of loading onto the vessel, and may involve assembly in a designated holding area. Where road transport is involved, the Guidelines for road transport would apply and are not addressed in detail in the Guidelines for sea transport.

The issues to be addressed in the design of pre-journey holding areas include securely containing the animals in a safe environment with protection from exposure to adverse weather, and allowance for rest, watering and feeding. In some situations the animals will be provided with a novel diet on the vessel, and a period of pre-conditioning to the feed may be necessary.

It is important to ensure that the animals selected are fit to travel and are placed in compatible groups if adverse animal welfare outcomes are to be avoided. The Guidelines state that animals should be inspected before travel and those found unfit should not be loaded. Several conditions are listed that would render animals either unfit to travel or fit to travel but requiring special conditions or attention. Similarly, the Guidelines indicate the factors that should be considered in the selection of compatible groups.

Loading

Loading onto the vessel requires careful planning and experienced supervision as it has the potential to adversely affect welfare in transported animals. The Guidelines state that loading should be supervised by the competent authority of the exporting country and managed by a competent animal handler(s). Animal handlers should ensure that animals are loaded quietly and without unnecessary noise, harassment or force, and that untrained assistants or spectators do not impede the process.

The facilities for loading, including the collecting area at the wharf, races and loading ramps, should be designed and constructed to take account of the needs and abilities of the animals with regard to dimensions, slopes, surfaces, absence of sharp projections, flooring, adequate lighting, sides, etc.

Guidance is provided on the use of goads (aids for encouraging animals to move) and the types of goads that are regarded as permitted or not suitable.

Journey

Regarding the journey itself, the Guidelines state that competent animal handler(s) should check the

consignment immediately before departure to ensure that the animals have been loaded according to the load plan. Adjustments should be made to the stocking density in pens within 48 h of departure and as appropriate during the journey.

In addition, the Guidelines state that each pen of animals should be observed on a daily basis for normal behaviour, health and welfare, and the correct operation of ventilation, watering and feeding systems. Any necessary corrective action should be undertaken promptly.

The Guidelines also state that sick or injured animals should be treated promptly and appropriately, and veterinary advice should be sought if necessary. All drugs and products should be used in accordance with the manufacturer's recommendations, and a record should be kept of treatments applied and their outcomes.

Unloading and post-journey handling

This stage of the process also requires careful planning and experienced supervision as it too has the potential to adversely affect welfare in transported animals.

Livestock vessels should have priority attention when arriving in port and have priority access to a berth with suitable unloading facilities. The animals should be unloaded into appropriate facilities as soon as possible after the ship has arrived in port and the consignment has been accepted by the competent authority of the importing country.

It is essential that all documentation meets the requirements of the importing country and that veterinary inspections should be completed as quickly as possible.

Unloading should be supervised by the competent authority of the importing country and managed by a competent animal handler(s). As with loading, the unloading process should not be impeded by untrained assistants or the presence of bystanders and the animals should be unloaded using minimum force and as quietly as possible.

The management of sick and injured animals at unloading requires some judgment. 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 euthanased aboard the vessel. If unloading is in the best welfare interests of such animals, there should be appropriate facilities and equipment for them to be unloaded humanely in a manner that causes the least amount of suffering. After unloading, appropriate facilities and treatments should be provided for sick or injured animals.

Refusal to import

The Guidelines provide several principles to assist the management of a situation where there is refusal to allow the import of a shipment. The most important is that the welfare of the animals should be the first consideration.

When a shipment has been refused approval to import, the Guidelines propose that the competent authority of the importing country should make available suitable isolation facilities that allow the animals to be unloaded and held securely, without posing a risk to the health of the national herd or flock, pending resolution of the situation.

The competent authority of the importing country should provide in writing the reasons for the refusal and, in the event of a refusal for animal health reasons, there should be access to an OIE-appointed veterinarian(s) to assess the animals' health status with regard to the importing country's concerns.

It is recommended that if the matter cannot be resolved promptly, the competent authorities of the exporting and importing countries should call on the OIE to mediate.

Similar principles are proposed where a shipment has been refused approval to import and the animals are required to remain on the vessel.

Research into sea transport of animals from Australia

Australia is the world's largest exporter of live sheep and cattle by sea – 3.3 million sheep and 0.6 million cattle were exported in 2004 (11).

Sheep

Nearly all sheep exported from Australia are transported to the Middle East for slaughter and most are exported from the Port of Fremantle in Western Australia, with smaller numbers exported from Adelaide in South Australia and Portland in Victoria (11). The rapid expansion of the live sheep export trade in the late 1970s and growing animal welfare concerns led to a period of intensive research into the industry during the 1980s and 1990s. The research involved analysis of industry mortality records, land-based studies, and investigations on ships travelling from Western Australia to the Middle East. The aims were to define the level of sheep mortality during the export process, and to identify the causes of death and the risk factors.

A typical research voyage involved selecting and identifying about 10,000 sheep on arrival at a pre-embarkation feedlot,

tracing them back to the farm and interviewing the farmer/manager to gather information about the previous management of the sheep, undertaking observations and treatments in the pre-embarkation feedlot and during loading onto the ship, and conducting post-mortem examinations and other observations during the voyage. Many research voyages and more than 1,000 detailed post-mortem examinations were undertaken. Such large-scale studies in a commercial setting and the application of pathology and epidemiological techniques had never been undertaken previously.

The main causes of sheep deaths during sea transport were inanition and salmonellosis (19). These two causes accounted for about 75% of all deaths aboard ship. Factors that affected the risk of sheep death were: consumption of the pelleted feed, farm group, age, time of year, fatness, duration between leaving the farm and unloading in the Middle East, and occasionally, temperature and humidity (8, 9, 12, 14, 15).

Death rates during the shipping phase varied widely between farm groups of sheep, with high death rates concentrated in only a few farm groups (9, 14). A study of 479 farm groups of sheep from 405 farms in Western Australia showed that death rates ranged from nil to 28%, with half of all deaths in only 14% of the farm groups. There were more deaths in sheep from the zones of higher rainfall and longer pasture-growing season (9).

Bars wrapped in dye-soaked sponge were attached to feed troughs to identify sheep which ate the pelleted feed provided (14). Although most sheep began eating the pelleted feed in the pre-embarkation feedlot or aboard ship, a few became persistent non-feeders, and it is these animals that were most likely to die. Giving them abundant quantities of feed or increased access to the feed troughs did not reduce the number of persistent non-feeders (10).

Age, fatness and time of year all had an effect on the risk of a sheep dying (8). Death rates during sea transport were higher in adult wethers (castrated male) than in younger wethers, and were higher in adult wethers in fat condition than those in lean condition, and there were more deaths during the second half of the calendar year than in the first half.

The explanation (8, 18) is that sheep coming from dry pasture in the first half of the year are in negative energy balance and are metabolically adjusted to using body fat reserves for energy – southern Western Australia experiences a Mediterranean climate and pastures decline in quality and quantity during the first half of the calendar year, and supplementary feeding, usually with cereal grains or lupins, is required for animals to maintain bodyweight. Any sheep which does not eat during the export process therefore has a better chance of survival because it is able to mobilise body fat reserves to produce energy.

In contrast, sheep coming from green pasture in the second half of the year are metabolically adjusted to laying down body fat and those which do not eat during the export process are not able to use body fat reserves for energy and are therefore at increased risk of death.

Immature sheep have a strong growth requirement and their powerful appetite drive overrides the seasonal cycles that are prominent in adult sheep. Consequently, there were fewer non-feeders and deaths among immature sheep.

Factors for which no association (or no consistent association) with mortality was shown include (15):

- distance trucked from farm to pre-embarkation feedlot
- time on the truck
- time off-feed from yarding on farm to unloading at the feedlot
- purchase history on the farm
- social interaction on the farm
- experience of supplementary feeding and type of feed as unweaned lambs
- experience of supplementary feeding and type of feed in the last nine months before export
- time of shearing on the farm.

An important finding was that most sheep began eating the pelleted feed within the first few days after loading onto the ship, even if they had not eaten this feed in the pre-embarkation feedlot. This was a consistent finding in research studies during actual commercial voyages and during simulated voyages (10, 16). In one such study, 85% to 93% of non-feeders in the pre-embarkation feedlot ate pelleted feed within the first three days of simulated shipping (10).

One of the outcomes of the research programme was the introduction of a system to record, collate and report mortalities of sheep on all sea voyages from Australia. The system involves the designated ship's officer recording details such as the location on the ship and the type of sheep (age, sex) for all deaths each day. This allows a more detailed analysis of mortality counts than is possible in the official report (ship Master's report) (12) to the Australian Government. The system was expanded recently to include consignments of live cattle and live goats, and the annual report (11) is distributed widely in Australia to Federal and state governments, industry and animal welfare groups.

Analysing mortality records is a useful way of monitoring industry performance but is less useful in journeys where deaths are uncommon, and it is not suitable for assessing the welfare of small groups of animals or individuals.

The latest records show that the death rate for all sheep during sea transport from Australia to all destinations was 0.75% out of 3.3 million sheep exported during 2004. Records also show that the annual death rate of sheep during sea transport from Western Australia to the Middle East has declined steadily since 1992 (Fig. 1) (11). The likely reasons for this trend include:

- declining age of the sheep exported
- reduced time in the export system (faster ships and a shorter pre-embarkation period which commonly lasts five days instead of more than ten)
- better facilities and management
- new ships with better ventilation systems.

Cattle

Live cattle are exported from many ports around Australia to destinations in South-East Asia, North Asia and the Middle East (11). Most cattle are exported for slaughter, either soon after arrival or following a period of feeding, but increasing numbers of dairy cattle have been exported in recent years. For example, the number of dairy cattle exported to the People's Republic of China grew rapidly from less than 1,500 in 2001 to 75,000 in 2004. Despite this rapid increase in exports, the death rate in dairy cattle in 2004 was 0.09%.

The death rate for all cattle during sea transport from Australia to all destinations during 2004 was 0.10% (Table I) (7).

Investigations on voyages to the Middle East showed that the main causes of cattle deaths were heat stroke, trauma and respiratory disease (13). All of the deaths from heat stroke were in *Bos taurus* breeds and occurred in the latter half of the voyage.

The research also showed that the risk of death on voyages to the Middle East was three times greater among cattle exported from southern ports in Australia compared to northern ports. The likely reason is the higher content of tropically-adapted *Bos indicus* cattle in northern Australia and their ability to handle the heat and humidity encountered during the voyage, in contrast to the *B. taurus* breeds from southern Australia.

This information has allowed the Australian Government to impose restrictions on the export of *B. taurus* cattle from southern ports between May and October when they are moving from winter conditions in Australia to summer conditions in the Middle East. These restrictions and other requirements have been included in the recently completed Australian Standards for the Export of Livestock (5).

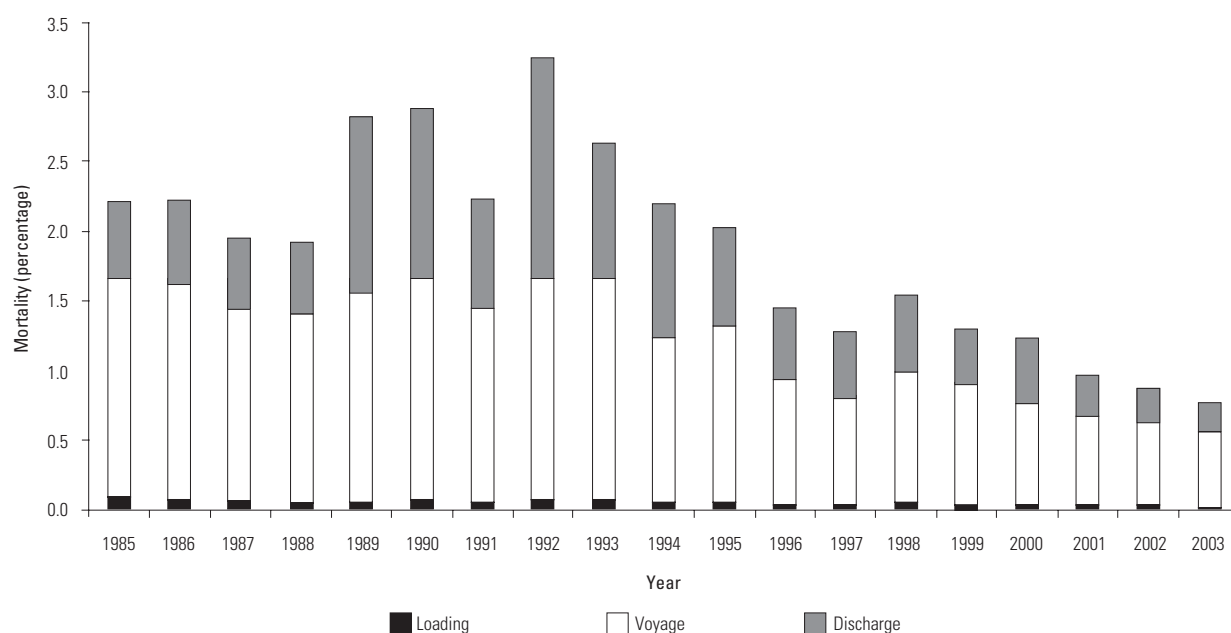


Fig. 1
Annual mortality of sheep on ships during sea transport from Western Australia to the Middle East
 The shipboard phase consists of loading, voyage to the first port of unloading, and discharge (includes all deaths after arrival at the first unloading port)

Table I
Death rates, number of voyages and number of cattle exported by sea from Australia to major destination regions during 2004

Parameter	South-East Asia	North-East Asia	Middle East	Mexico	Total
Number of voyages	211	49	31	3	294
Number of cattle	453,969	93,303	61,679	5,633	614,584
Overall death rate (percentage)	0.05	0.10	0.43	0.37	0.10

Recent research

For many years the Australian livestock export industry has funded research aimed at improving the health and welfare of livestock during sea transport. Recently, this has included research into the physiology of heat stress in cattle and sheep under conditions of live export (6) and the development of a model to assess the risk of mortality due to heat stress in livestock on voyages from Australia to the Middle East (4). The risk assessment model takes account of several factors including weather at destination and en route, animal acclimatisation, coat length, and the ventilation characteristics of each ship.

transport of animals adopts and follows the Guidelines developed by the OIE.

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Conclusion

It is expected that the practice of transporting animals by sea will continue indefinitely. The welfare of such animals will be enhanced if each country involved in the sea



Transport des animaux par voie maritime

R.T. Norris

Résumé

L'auteur décrit brièvement l'élaboration des Lignes directrices de l'Organisation mondiale de la santé animale (OIE) pour le transport des animaux par voie maritime. L'article précise la composition du Groupe ad hoc de l'OIE chargé du transport maritime des animaux, le mandat de ce groupe, le processus suivi et les consultations auxquelles ont donné lieu l'élaboration et la révision des lignes directrices. Un aperçu du contenu des lignes directrices est également présenté.

En outre, l'auteur décrit sommairement le programme de recherche entrepris pour déceler les causes des décès d'ovins et de bovins enregistrés durant leur transport par voie maritime à partir de l'Australie, le plus grand exportateur mondial d'ovins et de bovins par voie maritime. Une synthèse des principaux résultats de ces enquêtes est présentée.

Mots-clés

Bien-être animal – Exportation de bétail – Lignes directrices traitant du transport maritime – Transport des animaux par voie maritime.



Transporte de animales por vía marítima

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Resumen

El autor refiere sucintamente el proceso de elaboración de las directrices de la Organización Mundial de Sanidad Animal (OIE) para el transporte de animales por vía marítima. Asimismo, explica la composición del grupo *ad hoc* de la OIE que se ocupa del tema, expone su mandato y procedimiento de trabajo, describe las consultas realizadas para elaborar y revisar las directrices y presenta a grandes líneas el contenido de éstas.

Por otra parte, describe el programa destinado a investigar las causas de la muerte de ovinos y bovinos durante el transporte por mar desde Australia (que es el mayor exportador de ovinos y bovinos por vía marítima del mundo), y resume las principales conclusiones de esa investigación.

Palabras clave

Bienestar animal – Directrices sobre transporte por vía marítima – Exportación de ganado – Transporte de animales por vía marítima.



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