



**LIVECORP**  
THE AUSTRALIAN LIVESTOCK  
EXPORT CORPORATION



# Best practice for the export of livestock by air

A guide for the whole supply chain

**AUTHOR:** Tony Brightling, Harris Park Group  
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## THE LIVESTOCK EXPORT PROGRAM

The livestock export supply chain directly impacts both producers and licensed exporters. Meat & Livestock Australia (MLA) and LiveCorp, as the relevant research and development corporations, run a joint program known as the Livestock Export Program (LEP) to ensure that all stakeholders benefit from industry research.

The LEP RD&E Program focuses on strategic investment to:

- Improve animal health and welfare outcomes across the supply chain
- Improve supply chain efficiency and regulatory performance
- Enhance market access conditions for existing and new markets

LiveCorp and MLA acknowledge the contribution from the Commonwealth of Australia to research and development undertaken in the LEP RD&E Program.

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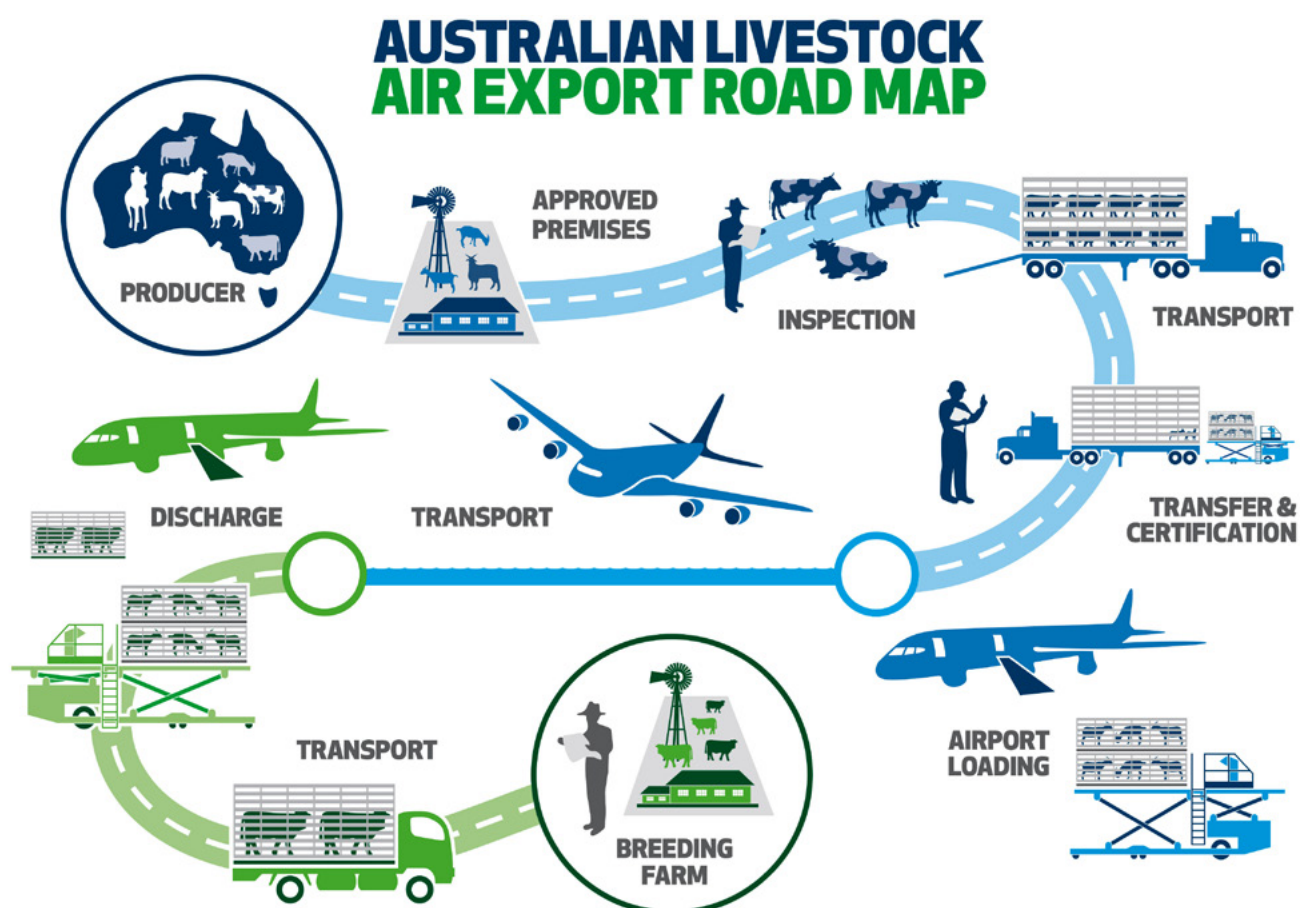
# 1. INTRODUCTION

Air freight allows licenced livestock exporters to deliver Australian livestock anywhere in the world, safely and in very good order. It is a highly-specialised boutique industry.

Air freight presents some unique challenges. Confinement of livestock in crates, in the controlled atmosphere environment of an aircraft hold, is very different from the conditions encountered when livestock are transported on land or by sea. Careful planning and attention to detail throughout export preparation and delivery are needed to protect animal welfare and ensure a successful commercial outcome.

All consignments of livestock exported from Australia by air must be selected and prepared for export and delivered overseas in accordance with the Australian Standards for the Export of Livestock (ASEL). This is a mandatory, regulatory requirement.

This manual is intended as a guide for livestock exporters, aircraft stock attendants and others involved in the air freight livestock export chain. It sets out current best practice procedures for exporting livestock by air, based on practical hands-on industry experience.



**Figure 1.** Australian livestock export air export road map.



## 2. CARGO TYPES

### KEY POINTS

Livestock may be exported by air:

- on a freighter aircraft fully committed to livestock; or
- with other (non-livestock) freight on a mixed cargo charter; or
- in a lower cargo hold of a passenger aircraft.

### 2.1 LIVESTOCK CHARTER

A 'livestock charter' is a freighter aircraft with the cargo capacity fully committed to livestock, and with the flight destination and time customised to the specific consignment. It provides the flexibility to export livestock from Australia to destinations around the globe.



**Figure 2.** Loading a livestock charter aircraft.

### 2.2 MIXED-CARGO CHARTER

With a 'mixed-cargo' charter, the exporter buys pallet space on a scheduled aircraft freighter service or passenger/freight combination aircraft. This works well if the animals are being consigned to a location close to an airport with a scheduled freighter service from Australia. The aircraft has a combination of livestock and general cargo on board (Figure 3). The exporter can book one or multiple pallet spaces.

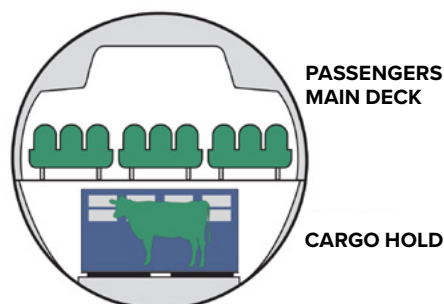


**Figure 3.** A mixed-cargo charter. Livestock on a scheduled freighter service from Australia to the Middle East, with livestock crates (left), general cargo (right) and a sports car loaded during transit in Singapore.

### 2.3 LOWER CARGO HOLD ON PASSENGER AIRCRAFT

Passenger aircraft have two lower deck cargo holds, one forward and one aft, below the main deck that carries passengers (Figure 4). Passenger baggage is carried in the lower cargo holds, together with small quantities of commercial freight.

When exporting livestock on a passenger aircraft, the exporter buys pallet space in the plane's lower cargo hold. However, many passenger aircraft are not able to carry livestock in the lower cargo hold, as the aircraft's ventilation system is not suitable for the carriage of livestock.



**Figure 4.** Schematic cross-section showing the cargo hold beneath passengers in an Airbus A330 aircraft. The lower cargo hold carries general cargo, and may carry livestock if the aircraft is fitted with a suitable ventilation system.



**Figure 5.** Livestock crates being loaded into the lower cargo hold of a passenger aircraft.

### 3. FREIGHTER AIRCRAFT

This section provides an overview of the freighter aircraft available to export livestock, with typical cargo configurations, payloads and flight ranges. However, there are many minor variations between aircraft of the same type, especially with environmental control systems. There is more variability with passenger aircraft that have been repurposed as freighters. Operational factors such as the flight distance and airport facilities also affect an aircraft's maximum payload. Every livestock aircraft charter is different and must be carefully checked that it meets consignment needs before a charter agreement is signed.

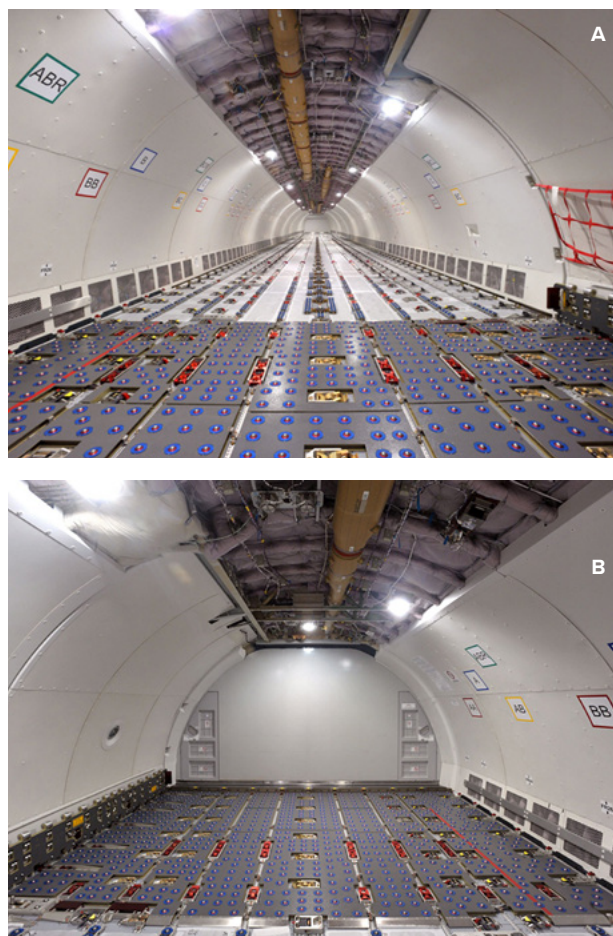
Freighter aircraft all have a 'supernumerary' crew area on the flight deck, immediately behind the cockpit, with 4-6 business-class seats, a couple of bunks, a galley and a toilet. It is where a stock attendant travelling with livestock sits during the flight. On Boeing 747 freighters, the flight deck is above the main cargo deck, with ladder access to the deck below. On all other freighters the flight deck and main cargo hold are on the same level, with a doorway in the bulkhead between them.

On all aircraft, the lower cargo holds can only be accessed from below, when the aircraft is stationary on the ground.

#### 3.1 AIRBUS A330-200F FREIGHTER

The Airbus A330-200F is a new-generation, medium-range, mid-sized cargo aircraft. It can lift a cargo of 65-70 MT and fully loaded has a range of about 7,000 km.

Cargo configurations vary depending on the aircraft model and crate design. The main deck typically carries up to 16 PMC pallets loaded in single row formation. In addition, four pallets may be loaded into each of the forward and aft lower deck cargo holds.



**Figure 6.** A330-200F main deck. (Top) Looking aft. (Bottom) Looking forward to the bulkhead with side access doors through to the flight deck.



**Figure 7.** Unloading livestock crates from the main deck of an A330-200F freighter.



### 3.2 BOEING 747-400F FREIGHTER

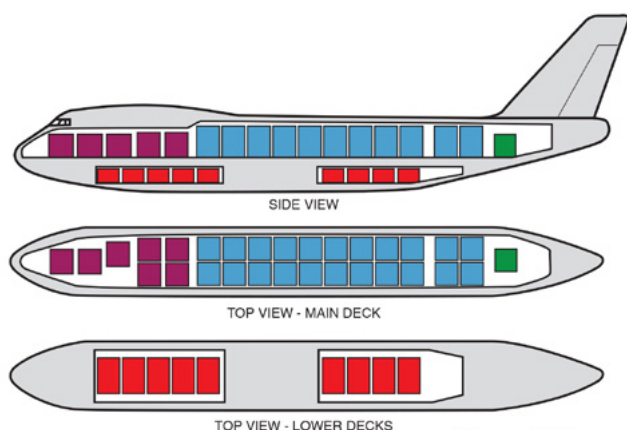
A Boeing 747-400F freighter can lift a cargo of about 115 MT, with a fully loaded flight range of about 8,000 km.

Cargo configurations vary slightly between aircraft.

A standard Boeing 747-400F freighter has 39 PMC pallet positions, with thirty on the main deck, five in the forward lower hold and four in the aft lower hold (Figure 9). On the main deck there are typically 22 positions that allow crates up to 300 cms high, contoured to the cargo hold roof. Where animal heights allow, these positions enable cattle to be exported in double-deck crates and sheep and goats to be exported in multi-deck crates. For aircraft stability, there is usually a significant weight restriction for the tail position on the main deck.



**Figure 8.** Unloading livestock crates from the main deck of a 747-400 freighter.



#### Maximum crate height

- |                               |                                  |
|-------------------------------|----------------------------------|
| ■ 240cm or 300cm with contour | ■ 240cm with weight restrictions |
| ■ 240cm                       | ■ 160cm                          |

**Figure 9.** Typical 747-400F cargo configuration.



**Figure 10.** 747-400F main deck looking aft. The ladder goes to the flight deck above. The door on the right provides access for personnel. Freight is loaded onto the main deck through a rear cargo door or nose cone.



**Figure 11.** Contoured double-deck cattle crates being loaded on the main deck of a 747-400 freighter through the rear cargo door.



**Figure 12.** Loading cattle into the aft lower deck hold on a 747-400 freighter.

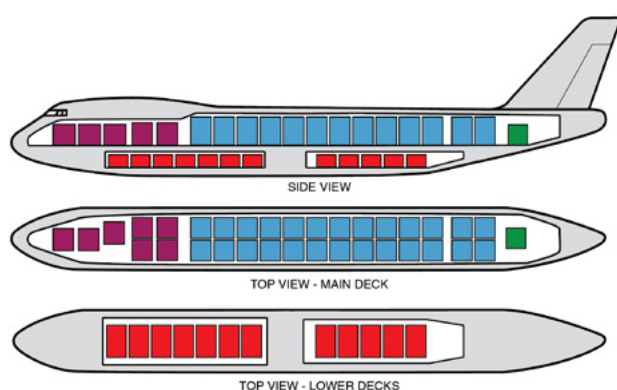


**Figure 13.** Loading cattle into the forward lower deck hold on a 747-400 freighter.



### 3.3 BOEING 747-8F FREIGHTER

The Boeing 747-8F is an updated version of the 747-400F. It is slightly longer than a 747-400F and can lift 15-20 MT more payload than a 747-400F. Cargo handling systems are similar to those in a 747-400F, but there are four extra main deck pallet positions and three extra pallet positions in the lower cargo holds (Figure 14).



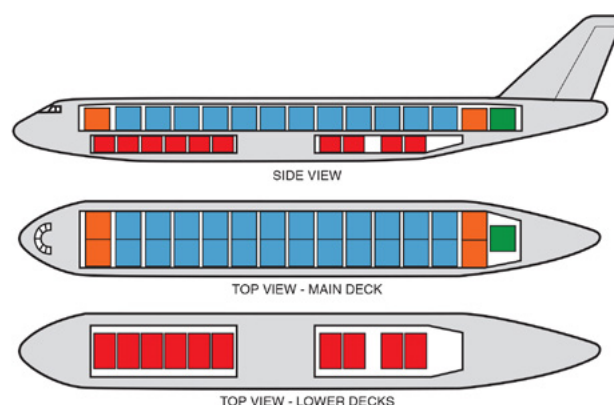
#### Maximum crate height

■ 240cm or 300cm with contour	■ 240cm with weight restrictions
■ 240cm	■ 160cm

**Figure 14.** Typical 747-8F cargo configuration.

### 3.4 BOEING 777 FREIGHTER

The Boeing 777 is a new-generation, long-range, heavy-lift cargo aircraft. It can lift just over 100 MT and fully loaded has range of about 9,000 km. It typically has 37 PMC pallet positions, with 27 on the main deck, six in the forward lower hold and four in the aft lower hold (Figure 15).



#### Maximum crate height

■ 240cm or 300cm with contour	■ 240cm with weight restrictions
■ 240cm or 290cm with contour	■ 160cm

**Figure 15.** Typical 777F cargo configuration.

### 3.5 BOEING 737-300F FREIGHTER

A Boeing 737-300F can lift a cargo of about 19 MT and fully loaded has a range of about 2,900 km. It has eight main deck PMC pallet positions. Given the small payload and short range, a 737-300F is rarely suitable for livestock exports from Australia. However, there are occasionally consignments where a 737-300F is suitable for short-haul destinations, such as to the Pacific Islands, Papua New Guinea or Timor-Leste.

## 4. AIRCRAFT STOCK CRATES

### KEY POINTS

- Most of the livestock exported from Australia by air fly out in single-use wooden crates.
- Crate design considerations include the height and shape of the crate, structural integrity, cross-ventilation, non-slip flooring, effluent control, doorways that allow smooth entry and exit of livestock, no injury points, crate handling method overseas, phytosanitary requirements, construction costs and weight of the crate.

### Cargo handling terminology

**ULD:** A ULD or 'Unit load device' is a pallet or container used to hold air freight cargo.

**PMC / P6P:** A PMC (also known as a P6P) is a general purpose flat pallet, made from aluminium alloy and measuring 317 x 244 cms (125 x 96 inches). It is the base used for most livestock crates. A PMC pallet has edge rails on all sides to secure a cargo net and straps. A permanent identification number is stamped or etched onto the pallet. A PMC pallet with cargo net and tie down straps typically weighs about 120 kg.

### 4.1 MANUFACTURE AND DESIGN CONSIDERATIONS

Construction of aircraft crates is a highly specialised manufacturing industry. Exporters are strongly recommended to only source crates from a supplier who has prior experience making livestock aircraft crates and is familiar with the design recommendations in MLA project W.LIV.0261 - *Best Practice Design of Crates for Livestock by Air* (2009) by Hogan & Willis.

LiveAir has developed an *Aircraft Pen Fit for Purpose Checklist and Fit for Purpose Certificates* for timber and aluminium crates. They are included in this manual as Appendices C-E. When ordering aircraft crates, an exporter should require an *Aircraft Pen Fit for Purpose Certificate* and *Checklist* to be provided with the crates.

Most of the livestock exported by air from Australia fly out in single-use, wooden crates. Key design considerations include:

- Constraints for crate height and shape for different positions in the aircraft.
- Structural integrity of the crate with different livestock loads.
- Stress calculations for lift and tie down points.
- Minimum tier heights for different classes of livestock.
- Floor construction to withstand lifting forces, contain effluent and provide livestock with a non-slip surface.
- Door and doorway design to facilitate smooth entry and exit of livestock, and allow easy and safe closing and opening, without compromising the structural integrity of the crate.
- Walls that allow adequate ventilation, but ensure animal containment and minimise the risk of animal injuries.
- Timber phytosanitary specifications.
- Construction costs and the weight of the crate.

### 4.2 VENTILATION

Air flow through, around and over livestock crates on an aircraft is essential for removal of body heat, supply of oxygen and dispersion of carbon dioxide and ammonia. Air flow through livestock crates is especially important in a number of situations:

- With contoured multi-tier crates that reach to just below the main deck ceiling, as the top deck is hotter than the bottom deck (heat rises) and there is limited air flow across the top of the crate.
- With 160 cm high crates in the lower cargo hold, as there is limited air flow across the top of the crate.
- If there is a solid block of multi-level livestock crates, or livestock crates interspersed with mixed cargo that forms a barrier to air flow.

Carbon dioxide is heavier than air and sinks to the bottom of a crate. Ammonia gas is lighter than air. However, in a high humidity environment, ammonia gas forms vapours that are heavier than air and settle to the bottom of a crate. On each tier of a livestock crate, ventilation openings must be provided in the lower half of all four walls as well as higher up. There must not be any ventilation dead space (still air) within the crate. Crates should have a ventilation opening 25 to 45 cms above floor level on all tiers, on all four sides, to allow for air circulation and dispersion of noxious gases.

Large ventilation openings facilitate air flow through the crate. However, openings in the crate walls must be small enough to prevent animals from putting a limb outside the crate resulting in feet or leg injuries. The maximum opening sizes recommended by Hogan & Willis (2009) are listed in Table 1.

**Table 1.** Maximum recommended size for wall openings (distance between the rails or diameter of cut-outs)

Maximum wall opening size (cm)	
Cattle and buffalo	13
Camelids	11
Sheep and goats	8

If a crate has plywood rather than timber rail sides, the solid side panels must not extend above head height for animals in a normal resting position, and multiple ventilation holes should be cut in all sides.



**Figure 16.** Animals standing normally must not touch the overhead crossbars or cargo net. If the crate has solid sides, they must not extend above head height and there must be ventilation openings in the lower half of the crate on all sides.



**Figure 17.** Cattle in a lower cargo hold. There is very little space between the top of the crate and the cargo hold roof. Open space at the top of the crate allows air flow over the cattle. However, without ventilation openings in the lower half of the crate, there is a large volume of ventilation dead space (still air) within this crate.

### 4.3 EFFLUENT CONTROL

To prevent effluent spillage into the aircraft, a layer of plastic sheeting is placed between the crate and pallet base as a waterproof barrier. As a secondary barrier, the crate walls should be solid and impermeable to 25 cm above floor level inside the crate. The crate floor should also be lined with an absorbent mat to soak up moisture and provide a non-slip floor surface. Wood shavings added to the crate at the time of loading provide additional absorbency and reduce the risk of animal injuries from slipping over in the crate. Wood shavings are particularly valuable when loading heavy cattle.



**Figure 18.** Carpet over the crate floor, to absorb moisture and provide a non-slip floor surface.

### 4.4 CRATE DOOR

Crate doors should slide from the side, not drop down from above, as there is much better control with a side closing crate door. Standing on top of a crate to close the door is also an unnecessary safety risk. With multi-deck crates, there needs to be a separate sliding door for each deck.

With cattle crates, the doorway frame is liable to structural damage if cattle hit the frame with force when exiting the truck. To reduce this risk, the truck opening should be narrower than the door of the crate. To further minimise the risk of damage to the crate, structural grade softwood or hardwood should be used for the door frame and the side of the crate containing the door should be corner braced. Quiet stock handling when loading the crate is also really important.





**Figure 19.** A crate door that slides from the side allows good control and is safe to use.

## 4.5 CRATE FLOOR

Some aircraft crates are designed without a structural floor. The crate frame sits on the aluminium pallet base with only a waterproof lining and absorbent matting between the livestock and pallet base below. This design significantly reduces the weight of the crate and construction costs. With a fixed external crate height, another advantage of deleting the structural base is an increase in the internal pen height. However, crate handling options overseas are limited, as a crate without a structural floor cannot be removed from its pallet base with livestock still inside, so cannot be lifted onto a flat top truck. Animals can only be released directly into a livestock truck, or into a livestock containment area. There is also a greater risk of structural damage to the crate with rough cargo handling.

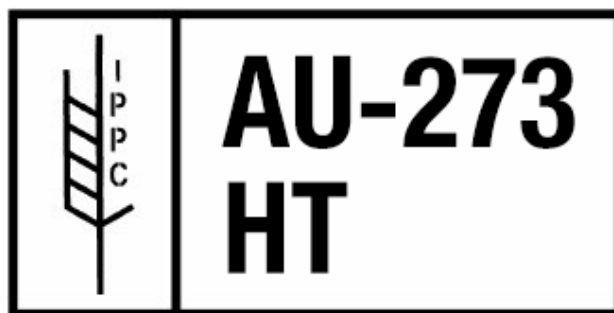
If the crate doesn't have a structural floor, it is important to have a tight and very secure tie down to each corner of the pallet base.

## 4.6 IPPC CERTIFICATION

Some countries have restrictions in place to prevent the introduction and spread of pests and diseases with wood used for packaging, including aircraft crates. The International Plant Protection Convention (IPPC) provides a framework for certification of packaging materials that have been treated against pests and diseases.

A stencil on the side of a crate indicates that the timber in the crate has been treated in compliance with IPPC standards. The stencil typically has the IPPC symbol, a country code (AU for Australia), the manufacturer's registration number, and a treatment code. An HT treatment code indicates the timber has been heat treated to 56 degrees Celsius or above for at least 30 minutes.

An importing country may require a timber crate without IPPC certification to be fumigated or destroyed under quarantine supervision at the importer's expense.



**Figure 20.** IPPC certification stencilled on the side of a timber crate.

## 4.7 CRATE HANDLING OVERSEAS

In Australia, livestock crates are often lifted by a forklift when empty, but when loaded with livestock are rarely moved other than on a roller bed system, airport dolly or scissor lift. However, after arrival overseas, aircraft crates loaded with livestock are often lifted by a forklift or crane. The crate design should include consideration of how the crate will be handled overseas. Failure of the crate floor structures is of particular concern, especially with multi-deck stock crates.

To facilitate forklift handling, the bearers and floor joists should be positioned so as to provide forklift openings on the long side of the base of the stock crate. When lifted by a forklift, the weight of the crate must be borne by floor joists and not by the floorboards or plywood flooring.

If crates are likely to be lifted by crane overseas, each crate should have strengthened crossbars at the top of the crate and designated weight bearing lift points.

## 4.8 TYPES OF CRATE

Figures 21 - 26 show examples of well-designed livestock crates.



**Figure 21.** Double-deck sheep/goat crate.



**Figure 23.** Single-deck cattle/alpaca crate.



**Figure 22.** Triple-deck sheep/goat crate.



**Figure 24.** Double-deck cattle/alpaca crate.





**Figure 25.** An unusual crate for a mixed species consignment. Double-deck, with cattle below and sheep on the tier above.



**Figure 26.** Camel crate. A single-deck 300 cm high crate with full length door.

## 4.9 REUSABLE METAL CRATES

Reusable metal crates are occasionally used to export livestock from Australia by air (Figure 27). These crates have a number of significant advantages – a ‘one-off’ construction cost, a lighter weight and a slightly greater pen floor area than with most single-use wooden crates. However, the down side of reusable metal crates is the hassle of getting the crates back to Australia after each consignment and the cleaning and disinfection needed to meet Australia’s strict quarantine requirements.



**Figure 27.** Reusable livestock crate.



## 5. AIRCRAFT LOAD PLAN

### KEY POINTS

- Careful consignment planning is required to ensure animal needs, regulatory requirements and the constraints of the aircraft are fully taken into account.
- A draft aircraft load plan should be prepared at the initial consignment planning stage, and updated when animal numbers and weights are known more accurately.
- The aircraft load plan must be developed in close collaboration with the air freight forwarder.

An aircraft load plan should be prepared at the initial consignment planning stage – before any crates are ordered or livestock purchased for export. It is essential that the load plan is checked and approved by the air freight forwarder, to ensure that aircraft constraints have been met.

The load plan should be updated once livestock for the consignment have been sourced and their weights are known more accurately. An example load plan is included in this manual as Appendix B.

### 5.1 AIRCRAFT CONSIDERATIONS

Key aircraft considerations are:

- maximum total cargo weight
- maximum weight in the aircraft tail
- aircraft trim – especially an appropriate balance of cargo weight forward and aft.
- maximum crate height in different parts of the aircraft; and
- the aircraft's environmental control system (ECS) capability.

### 5.2 CATTLE, BUFFALO AND ALPACA

On all aircraft types, the lower cargo holds can only hold cattle, buffalo or alpaca in single-deck crates. Double-deck crates can be used on the main deck on Boeing 747-400, Boeing 747-8F and Boeing 777 freighters. However, single-deck cattle crates have a number of practical advantages:

- When loaded onto the aircraft, there is better ventilation with greater airflow across the top of a single-deck crate than over a double-deck crate.
- After removal from the aircraft overseas, single-deck cattle crates are easier to handle and less likely to get damaged than larger, heavier double-deck crates.
- At the end destination overseas, it is easier to unload animals from a single-deck crate than from the top deck of a double-deck crate.

When preparing a load plan for cattle, buffalo and/or alpaca in a full livestock charter consignment, use as many single-deck crates as possible. If the desired total cargo weight and number of animals cannot be achieved using only single-deck crates, then use the minimum number of double-deck crates needed to load the number of animals required in the consignment or reach the aircraft's cargo weight limit.

Animal height is another load plan consideration. Livestock standing normally must not touch the overhead crossbars or cargo net – so it is important to know both the height of the animals and the internal height of the crates to be used.

Special consideration is required for bulls. Most bulls do not like to be penned alone. It causes stress and makes the bull restless. An agitated bull can put a lot of pressure on the uprights, crossbeams and sides of the crate, and may break the timbers. If there are multiple bulls in the consignment, they travel best when penned together, provided they are of similar weight, have run together beforehand and are socially adjusted. Bulls travel best if they have enough space to move comfortably around but maintain body contact with other bulls in the crate. If there are only two or three bulls in the consignment, a bull crate built smaller than a full pallet size is recommended. If there is only one bull in the consignment, and pregnant heifers, the best option is a crate with an internal partition, with the bull on one side and pregnant heifers on the other side.

### 5.3 SHEEP AND GOATS

Single-deck and double-deck sheep/goat crates can be used in any pallet position on the main deck of a freighter aircraft and in any pallet position in the lower cargo holds.

On Boeing 747-400, Boeing 747-8F and Boeing 777 freighters, multi-deck sheep/goat crates can be used on the main deck.

### 5.4 CAMELS

Camels can only be loaded onto the main deck of a freighter aircraft. A crate 300 cms high with a long door is recommended for camels.



**Figure 28.** Loading a camel crate.

### 5.5 STOCKING DENSITY

The maximum number of animals that may be loaded into an aircraft crate depends on their bodyweight. The Australian Standards for the Export of Livestock (ASEL) has a series of tables that give the minimum pen area per head for animals of different bodyweights.

The internal floor space for a timber crate on a PMC pallet depends on the crate design, and is typically in the range 6.2 – 6.7 m<sup>2</sup>. With double-deck cattle crates and triple-deck and four-deck sheep/goat crates, the roof of the top deck is contoured to fit the shape of the aircraft. This contour reduces the effective pen area of the top deck, as there is less head room in the contoured section. The pen area used to calculate stocking density on the top tier of multi-deck contoured crates should be adjusted accordingly.

Additional pen area per head may be required for some consignments, such as with long journey times, horned animals or sheep in wool. Early in consignment planning, ASEL should be checked for any additional pen space requirements that might apply.

## 6. LIVESTOCK SELECTION AND PREPARATION FOR EXPORT BY AIR

### KEY POINTS

- Livestock exported by air must be prepared for export in accordance with the Australian Standards for the Export of Livestock (ASEL).
- Careful planning is required to achieve optimum utilisation of cargo weight and pen space constraints.
- Livestock should be drafted into lines by type and weight before delivery to the airport.
- A feed and water curfew has major benefits. However, time off water must not exceed the maximum water deprivation times in the Australian Land Transport Standards.

All consignments of livestock exported from Australia by air must be prepared in an approved premises and in accordance with Australian Standards for the Export of Livestock (ASEL). They must also comply with all importing country protocol and/or import permit requirements and with any commercial specifications in the contract of sale. This section covers best practice procedures that relate specifically to the export of livestock by air.

### 6.1 LIVESTOCK SELECTION

Careful planning is required to achieve optimum utilisation of the aircraft, loading up to cargo weight and pen space constraints.

A relatively small change in the average weight of livestock in the consignment can make a significant difference to the number of animals that can be loaded. A narrow weight range within each line of animals is generally desirable. When selecting livestock for export by air, it is important to set and follow clear weight specifications.

Animal height is also a consideration. ASEL requires that when livestock stand normally, no part of the animal's body may touch any overhead part of the crate. Depending on the internal dimensions of the crates to be used, an animal height specification may also be necessary.

### 6.2 ANIMAL SOCIALISATION

During pre-export isolation, bulls that will be penned together on the aircraft should be run together for as long as possible beforehand, to become socially adjusted.

Goat bucks exhibit strong dominance behaviour when closely confined with other bucks. This is especially so for rangeland goat bucks. Smaller, subservient bucks that are repeatedly mounted in quarantine should be removed from the consignment, placed in a refuge area,

and either rejected from export or loaded as a separate line. Large, dominant goats that repeatedly mount others should be isolated in quarantine and loaded on the aircraft as a separate group.

### 6.3 PRE-WEIGHING AND DRAFTING

For optimum utilisation of the aircraft, it is essential to have an accurate assessment of animal weights and load up to, but within, the weight and pen space constraints for the consignment. Accurate weights and careful planning also eliminate last minute adjustments at the airport because animals are heavier than predicted and are either too tight in the crate or exceed the weight limitation of the aircraft.

All cattle and buffalo exported by air should be individually weighed 2-3 days prior to loading, to give an 'out of the paddock' weight. The weight of animals delivered to pre-export isolation should not be used as delivery weights are affected by trucking. Paddock weights can be adjusted down slightly to allow for weight loss from a feed and water curfew prior to loading. An accurate assessment of weights simplifies and assists loading procedures. The more accurate, the better. Once individual weights are known, animals can be allocated to specific crates for the flight.

Sheep and goats exported by air should be drafted into lines by type and weight. The average weight of each line can be determined by weighing a representative sample of animals. It is not necessary to weigh sheep and goats individually. The representative sample should be at least 10% of the line, or 10 animals, whichever is greater.

Alpacas should be individually weighed and allocated into aircraft crate groups prior to loading.

### 6.4 FINAL INSPECTION

A final inspection of the livestock should be scheduled for the day prior to loading the aircraft, so that everything is squared away ready to load. It is too late to be looking for rejects, checking pedigrees, sorting out identification issues or drafting a full freighter load of livestock on the day of loading.

### 6.5 FEED AND WATER CURFEW

Ruminants (buffalo, camelids, cattle, sheep and goats) all travel better if they have a feed and water curfew prior to departure. This is to reduce the amount of faeces and urine produced whilst the animals are in transit. With less faeces and urine underfoot, there is less risk of animals slipping over in the trucks taking them to the airport, or in the aircraft crates. This is especially important for heavy cattle and buffalo, as slipping over can cause a serious leg injury, such as a dislocated or fractured hip.



There are other important benefits from a feed and water curfew prior to loading. Less urine and faeces in the aircraft crates helps with humidity and ammonia control in the aircraft hold. With reduced rumen activity, there is also less body heat generated during the flight. Curfewed animals also present better on arrival, with less faecal contamination of their coats.

However, there is a limit beyond which feed and water deprivation is detrimental. After 48 hours off feed and water, significant changes start to occur in the rumen microflora, and recovery time after the flight is prolonged. With an extended period off feed and water, there is also an increased risk of abortion in pregnant animals.

ASEL sets the maximum water deprivation time for livestock exported by air the same as for land transport in Australia. The maximum times off water specified in the Land Transport Standards are listed in Table 2. Shorter water deprivation times apply for some specific classes of livestock, such as heavily pregnant animals and lactating animals with young at foot. They are not listed in Table 2 as these classes of livestock are not typically exported by air.

A water curfew of at least six hours before departure from pre-export isolation is recommended, and provided maximum water deprivation times are not exceeded, a longer water curfew is better.

When deciding how long to curfew stock before loading, the total time off feed and water must be taken into account – from the time when feed and water are cut off in Australia until the animals have ready access to feed and water again at their overseas destination. This may be some hours after the plane lands, whilst arrival formalities are completed and the stock are transported to their end destination.

Stock should be held off green feed for at least 36 hours prior to leaving for the airport, but should be provided with pasture hay or other dry roughage until about 6-8 hours before departure from pre-export quarantine.

Given the short maximum water deprivation times for alpacas under 12 months of age, and for pregnant alpacas, they are sometimes provided with water in a drinker bowl or bucket inside the crate, with a funnel that allows water to be provided in transit. This is not standard practice for other classes of livestock. The bucket and its supports must be sturdy enough to prevent breakage when being stood on or kicked, and the funnel must allow filling from the outside with minimal spillage in the crate.



**Figure 29.** A bucket in an aircraft crate of alpacas, so water can be provided when journey time exceeds the maximum water deprivation time.

**Table 2.** Maximum water deprivation times (as listed in the Australian Land Transport Standards)

Maximum time off water (hours)		
Alpacas	• Non-pregnant females, wethers and males over 12 months of age	24
	• Alpacas 6-12 months of age	8
	• Alpacas up to 7.5 months pregnant	8
Buffalo	• Buffalo over 6 months of age	36
	• Calves 1-6 months of age	24
Camels	• Camels over 6 months of age	48
	• Calves 1-6 months of age	24
Cattle	• Cattle over 6 months of age	48
	• Calves 1-6 months of age	24
	• Cows more than 6 months pregnant	24
Goats	• Goats over 6 months of age	48
	• Kids under 6 months of age	28
Sheep	• Sheep over 4 months of age	48
	• Lambs under 4 months of age	28



**Figure 30.** Crate floor after discharge overseas. The cattle in this crate did not have an adequate curfew prior to loading. Faeces and urine made the crate floor slippery. The carpet lining on the floor was torn by cattle thrashing around trying to stand up after slipping over.

## 7. CRATE INSPECTION, PREPARATION AND STORAGE PRIOR TO LOADING

### KEY POINTS

The aircraft crates should be:

- closely inspected before the day of loading; and
- stored under cover until required for loading.

Each livestock crate to be used should be closely inspected prior to the day of loading. If there is anything amiss, such as a cracked timber, missing door panel, damaged flooring, crates missing or wrong size – discovering the problem at loading is simply too late. Checking the crates before the day of loading gives time to correct any issues found.

It is really important that livestock crates are not left outside in the rain. The waterproof plastic lining on the floor of the crate does not allow water to drain away. Any rain falling into a crate pools, producing a sodden floor, which adds weight to the crate, increases the risk of animals slipping and adds to humidity when loaded into the aircraft.

It is also important that livestock crates are not left out in the sun, as the timbers are liable to warp, so the doors do not open and close smoothly.

Livestock crates should ideally be delivered to the airport a day or two before they are required, and must be stored under cover. Under cover storage at airport freight handling depots is often limited. Livestock crates are bulky items and there may not be sufficient under cover storage available, especially for a full charter consignment. If sufficient under cover storage is not available at the airport, crates should be stored under cover somewhere nearby, delivered to the airport 'just in time' prior to loading, and protected from the weather, especially rain, as best as possible.

The final stage when preparing a livestock crate for loading is 'dressing' it on a pallet base. The crate is strapped onto a pallet base, with a waterproof plastic lining between the crate and the pallet that is stapled to and extends about 25 cms up the sides of the crate. It is important to ensure that the plastic skirt does not block ventilation openings and inhibit airflow across the bottom of the crate.

A cargo net is then loosely put in place and secured about three-quarters of the way around the crate, leaving access to the crate door. This is done by the freight handlers at the airport. It should be done prior to the start of loading, so crates are presented ready for loading, with no delay whilst crates are dressed, and the time required for the cargo net to be tied down after loading is kept to a minimum.



**Figure 31.** The plastic waterproof barrier between the crate and pallet extends too high, blocking the lower ventilation openings and preventing airflow across the base of this crate.



**Figure 32.** A double-deck sheep crate ready for loading with livestock – strapped to the pallet base and with the cargo net three-quarters of the way around the crate, leaving access to the crate door.

## CHECK LIST

### Exporter’s crate inspection prior to loading

- ☐ Manufacturer’s *Pen Fit for Purpose Certificate and Checklist* supplied and complete.
- ☐ Correct numbers and types of crate supplied.
- ☐ Crates stored under cover and kept dry at all times prior to loading with livestock.
- ☐ Crates structurally sound, steel brackets in place, bolts fastened. No damage.
- ☐ Doors present and open and close smoothly.
- ☐ No exposed staples, screws or nails and no jagged or sharp edges.
- ☐ Correct floor type. Floor matting secure.
- ☐ Crate is clean, free of rubbish, tools, scrap.
- ☐ Crate marking correct – customer / exporter names and logos (if required).
- ☐ Manufacturer’s details and IPPC stamp stencilled on timber crates.



## 8. LIVESTOCK DELIVERY TO THE AIRPORT

### KEY POINTS

- Aircraft arrival should be checked for delays before any livestock are loaded onto trucks for delivery to the airport.
- Stock should not be held on trucks or in crates at the airport any longer than necessary.
- Cattle should be delivered to the airport penned on the truck in aircraft crate lots.
- A detailed trucking plan is essential.

### 8.1 AIRCRAFT ARRIVAL CHECK

Delays to incoming aircraft are not uncommon. Before any animals are loaded onto trucks at pre-export quarantine, it is important to check that the flight is on time. Livestock should not be held at the airport, in trucks or in aircraft crates, for any longer than necessary. Good communication between the airline, air freight forwarder and exporter is essential.

### 8.2 CATTLE AND BUFFALO

Cattle and buffalo should be drafted into crate lots at pre-export quarantine, not at the airport. They should then be delivered to the airport penned on the truck in aircraft crate lots, so they simply need to be transferred from their truck pen into their aircraft crate.

With animals weighed and drafted into aircraft crate lots in pre-export quarantine, loading into crates at the airport is much smoother and quicker, less stressful for both the cattle/buffalo and staff involved, and there is less risk of injury to the animals or structural damage to the crate.

### 8.3 SHEEP AND GOATS

If there are multiple small lines of sheep and/or goats in the consignment, they should also be drafted into crate lots at quarantine and delivered to the airport penned on the truck in aircraft crate lots. However, if there is a large, even line of sheep or goats, they can be delivered to the airport as a single line and counted out of the truck into their crates. In this case, it is important to have accurate weight records and a narrow weight range within each line of animals, and to pre-determine the number of animals required to fill each crate deck.

### 8.4 TRUCKING PLAN

A trucking plan that sets out the order that animals will be delivered to the airport is essential. The transport coordinator, exporter, quarantine premises manager and air freight forwarder all need a copy of the trucking plan, so that the right crates are presented and loaded with the right animals in the right order. This is especially important for multi-deck crates, where a different stocking density is required on the top deck. It is also important to have animals on the correct deck of the truck, to avoid loading animals from the bottom deck of a truck into the top deck of a crate.

## 9. LOADING AT THE AIRPORT

### KEY POINTS

- Good coordination of the various parties involved is critical for smooth and efficient loading at the airport.
- The exporter should appoint an animal welfare officer to oversee aircraft crate loading.
- Crates loaded with livestock should be parked in a low-activity area, protected from direct sun and rain, until loaded onto the aircraft.
- The aircraft's environment control system (ECS) must be switched on before livestock are loaded onto the aircraft.
- Air flow is an important consideration when positioning livestock crates on the aircraft.
- The Captain must be given a Special Load Notification to Captain (NOTOC) form, with specific instructions regarding livestock management during the flight.

transferred from livestock trucks into aircraft crates. With small consignments, the exporter may fill the role of animal welfare officer, but with a full aircraft charter there should be a dedicated stockperson appointed.

**Aircraft stock attendant.** The aircraft stock attendant is a competent stockperson, engaged by the exporter to accompany the consignment and oversee animal welfare during the flight, at transit stops and during unloading at the destination airport.

### 9.2 SUPERVISION OF AIRCRAFT CRATE LOADING

Good coordination of the various parties involved is critical for a smooth, efficient, incident-free loading. Liaison between the exporter and air freight forwarder is particularly important. As a general rule, the air freight forwarder makes arrangements with the airline and freight handlers for crate loading and simply advises the exporter when and where animals must be delivered to the airport. The air freight forwarder needs a copy of the trucking plan, and will advise the freight handlers of the sequence for bringing specific crates to be loaded.

The exporter normally advises the quarantine manager and trucking supervisor of the time that animals are required at the airport and the order of loading. The quarantine manager, trucking supervisor and truck drivers all need a copy of the trucking plan.

The exporter must also advise the government supervising veterinarian of the proposed time for departure of the animals from quarantine and the scheduled time to start loading crates at the airport.

The transfer of animals from truck to crate is a time when mistakes can easily be made. The exporter should appoint an animal welfare officer to oversee loading into the aircraft crates. The animal welfare officer's responsibilities include:

- Checking each crate before loading, to ensure its structural integrity, and that there is nothing in the crate that will make animals balk at the doorway or cause injury during the flight.
- Making sure that the trucks back up closely to the docking area, so there isn't a gap between the back of the truck and crate, which might trap a leg or allow an animal to escape.
- Making sure that the crate door is closed before the crate is moved away from the truck, so animals cannot escape. Making sure also that the crate door is firmly nailed or screwed in place before the cargo net is tied down.
- Making sure that when a crate is moved away from the back of the truck, and the next crate is being positioned, animals cannot escape from the back of the truck.

### 9.1 WHO'S WHO AT LOADING

**Air freight forwarder.** The air freight forwarder is the link between the Australian exporter and the airline. He/she sets up the air freight contract and liaises with the airline and airport on all aviation matters, from initial assessment of the aircraft's suitability for a particular cargo, to crate loading times and logistics, acceptable crate weights, security clearance for the aircraft stock attendant, access to the aircraft, certification of aircraft disinfection and the like. The air freight forwarder also supplies or arranges for an Airway Bill to be issued.

**Aircraft loadmaster.** The aircraft loadmaster is employed by the airline. His/her job is to ensure the cargo is loaded safely and efficiently, and that the aircraft departs on time. The loadmaster determines where each crate is positioned on the aircraft. The loadmaster is also the key link with the aircraft crew, providing the Captain with any specific instructions about livestock management during the flight. With a full charter, if the aircraft is going to a new and out of the way location, the loadmaster sometimes goes with the consignment to ensure the cargo is unloaded promptly and safely, without damaging the aircraft.

**Air freight handlers.** The air freight handlers are either employed or contracted by the airline to move crates around the airport, weigh the crates, tie the crates down and load them onto the aircraft. When not loading livestock, they handle all kinds of other airline freight.

**Animal welfare officer.** The animal welfare officer is a competent stockperson appointed by the exporter to oversee animal welfare at the airport whilst animals are

- Making sure that the correct animals are loaded into the correct tier of the correct crate.
- Making sure the stocking density in each crate meets ASEL requirements, and that all animals have sufficient head room.
- Attending to any animal injured in transit to the airport.
- Making sure that truck drivers unload their vehicles in a quiet, low stress manner, using paddles or rattles not electric prodders.

Great care to avoid animal escapes is essential. Ideally, transferring livestock from truck to aircraft crate should be done where an animal can be readily contained if there is an escape, such as a secure customs yard or shed.

The aircraft crate should be strapped to the truck (Figure 33) to ensure it is not pushed away from the truck as animals enter, creating a gap between the truck and crate. If the truck and crate are strapped together, the strapping must be undone before the truck moves away, or it will drag the crate behind.



**Figure 33.** The aircraft crate and truck are strapped together to prevent the crate being pushed away, creating a gap that might cause injury or allow an animal to escape.

In the unlikely event of an animal escaping, the animal welfare officer and exporter should have a contingency plan in place, to contain and recapture the animal in the immediate area.

If there are only a handful of crates to load, the exporter may fill the role of animal welfare officer. But for a full charter, where loading animals into crates takes several hours, a dedicated animal welfare officer is recommended. This frees the exporter to attend to other things.

### 9.3 AIRCRAFT CRATE LOADING

The airlines generally require all crates to be loaded with livestock, weighed, tied down and ready to be loaded onto the aircraft 3-4 hours prior to the aircraft's scheduled departure time. This allows the loadmaster time to calculate the optimum location for each crate on the aircraft and for all crates to be loaded on the aircraft half an hour or so before the scheduled departure time.

The loadmaster does not have any hands-on involvement loading livestock into crates, but actively monitors progress. With a full charter, where loading animals into crates takes several hours, the loadmaster will progressively add crate details (crate type, pallet PMC number and gross weight) into the airline's computer system. The aircraft's maximum payload weight may be a limiting factor for a full charter. If so, the loadmaster will advise the air freight forwarder as the cargo weight approaches the aircraft's payload limit. If the aircraft has a tight schedule, due to flight or landing right restrictions, or subsequent cargo commitments, the loadmaster may, at his/her discretion, declare a cut-off and not accept crates loaded late, so the aircraft departs with livestock left behind.

The length of time the freight forwarder allows to load the consignment into crates depends on the exporter's air freight experience and track record. There are two key considerations – aircraft departure must not be delayed because the livestock crates haven't been loaded in time, and the time animals spend in aircraft crates prior to departure should be kept to a minimum. The air freight forwarder advises the exporter what time animals need to be at the airport for loading, and arranges the freight handling required.

The airline requires each loaded crate to be accurately weighed. This is so that the crates can be positioned on-board to optimise the aircraft's trim and fuel efficiency. It also provides an accurate total cargo weight.

The loading dock where animals are transferred from truck to aircraft crate generally has a weighing platform, or there is a scales immediately nearby, that enable each crate to be weighed empty as it is presented to the truck, then weighed again after the animals are loaded.

When loading crates, it is helpful to have some spare straps, a tool kit, a couple of spare timbers and some tek-screws and nails handy, so repairs can be made if there is minor damage to any of the crates.



**Figure 34.** Docking platform for transfer of livestock from truck to aircraft crate – in a disused hanger that provides protection from the weather and is a secure area in the unlikely event of an animal escaping.

For every crate, there must be a record of the:

- PMC number - which is stamped on the aluminium pallet base;
- type of crate;
- weight of the crate empty, (including pallet base and cargo net);
- weight of the crate loaded; and
- species and number of animals loaded.

This information allows the average weight of animals in the crate to be calculated. After each crate is loaded, and before it is removed from the docking platform, the stocking density should be checked to ensure the minimum crate pen area per head specified in ASEL is met. There should also be a quick visual check that the animals have sufficient head room.

If more than two or three crates are to be loaded, a table and chair set up close to the weighing scale and one person dedicated to record keeping is strongly recommended.



**Figure 35.** Recording table and chair set up beside the aircraft crate loading point.

To speed up loading large consignments, once the gross weight of the crate has been recorded and the stocking density checked, the crate can be moved aside to be tied down. This frees up the docking station to load the next crate.

The crate doors need to be securely fastened. This may be done at the loading dock or tie-down station. If crate doors are secured with flat-head nails, they should be left slightly out, not hammered fully home, so removal with a claw hammer is easier when unloading overseas. Alternatively, the crate doors can be secured with tek-screws, which provide greater security but require a drill and bit to remove.

With a large consignment, the crates should be identified with texta pen written on at least one side. This is in addition to the PMC number stamped into the pallet base and the paper label the freight handlers tie to the cargo net. The texta pen numbering system is not critical, and is simply to allow easy visual identification of crates on the tarmac in Australia and overseas.

The final task when loading livestock into aircraft crates is to tie down the cargo net. It provides additional security and prevents animals from escaping if the crate door comes undone or there is structural damage to the crate.

The loaded crates should then be parked in a low-activity, well-ventilated area, with shade from direct sun and out of any rain until they are loaded onto the aircraft.



**Figure 36.** Tie-down station.





**Figure 37.** With tie-down completed, the crate is ready to load onto the aircraft.



**Figure 38.** The airline's tag tied to the cargo net, with PMC number, weight of the loaded crate and a direction to load in the lower cargo hold.



**Figure 39.** This cattle crate door frame was broken when the exporter tried to take an animal out of the crate, back into a truck. The cattle had not been pre-weighted and drafted into crate lots. There was much wasted time and unnecessary stress on the cattle and the crate could not be adequately repaired on the day of export.

## 9.4 AIRCRAFT ECS FIT FOR PURPOSE CHECK

An aircraft's Environment Control System (ECS) must be able to remove the body heat, carbon dioxide and ammonia generated by the livestock on board. Temperature control and ventilation are critically important for the health and wellbeing of livestock on the aircraft. The aircraft's ECS must be suitable for the livestock cargo and must be working properly.

A check of the ECS should be done before any livestock are loaded onto the aircraft.

## 9.5 POSITIONING CRATES WITHIN THE AIRCRAFT

The loadmaster determines where each crate is positioned on the aircraft. This is done with a computer program that optimises aircraft trim and fuel efficiency. Although the final decision about the position of crates on the aircraft rests with the loadmaster, he/she can be asked to accommodate specific animal needs. The key considerations are as follows:

- If all pallet positions are not required, main deck pallet position should be used in preference to the lower cargo holds.
- Where possible, floor to ceiling livestock crates should not be positioned as a block, as this impedes ventilation, with air flow channelled down the side of the crates, creating a local heat bank and an increased concentration of noxious gases within the crate. Air flow through the crates is much better if floor to ceiling crates are interspersed with lower crates, or an empty pallet position.
- If livestock are being carried with other mixed cargo, the other cargo must not be a barrier that restricts air flow over and through the livestock crates.



**Figure 40.** If livestock are loaded with other mixed cargo, the other cargo must not be positioned so as to restrict air flow over or through the livestock crates.



**Figure 41.** Air flow is enhanced if multi-deck floor to ceiling crates are interspersed with lower crates or empty pallet positions.

## 9.6 LOADING CRATES INTO THE AIRCRAFT

When the aircraft is ready to start loading, the crates are towed to the plane on airport dollies and lifted to the cargo hold door with a scissor lift. A roller bed system on the dollies, scissor lift and floor of the cargo hold allows the crates to be moved quickly and smoothly with minimal manual effort.

Aircraft loading is overseen by the aircraft loadmaster, with little if any need for involvement by the exporter or aircraft stock attendant.

Loading crates into the aircraft should be done as close as possible to the flight departure time. The aircraft's auxiliary power unit (APU) should be switched on and used to operate the aircraft's environmental control system (ECS) prior to loading any livestock.



### Key directions for the loadmaster

Crates loaded with livestock should be kept in a low activity area, in shade and out of any rain, until they are loaded onto the aircraft.

Crates loaded with livestock should not be towed onto the tarmac and parked in the open until just before they need to be loaded onto the aircraft.

The aircraft's APU must be switched on and used to power the ECS to ventilate the cargo holds prior to loading any livestock.

To keep time on the aircraft to a minimum, livestock should be loaded as close as possible to the flight departure time.

If all pallet positions are not required for livestock, main deck positions should be used in preference to the lower cargo holds.

If all pallet positions in the lower cargo holds are not required for livestock, use mid hold positions rather than positions next to a bulkhead.

Where possible, floor to ceiling livestock crates should not be positioned as a block. Instead, they should be interspersed with lower crates or empty pallet positions.

If livestock are carried with other mixed cargo, the other cargo must not be a barrier that restricts air flow over and through the livestock crates.

The lower cargo holds should be loaded last.

The cargo doors should be closed as late as possible, just prior to departure.

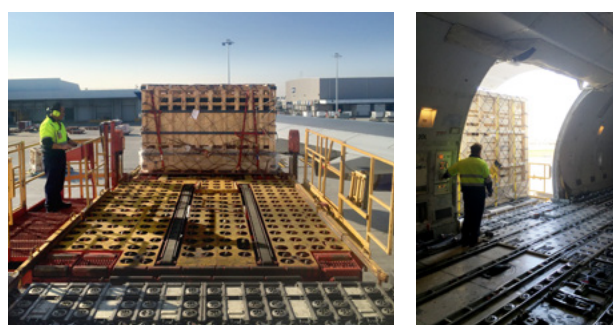
The Captain must be provided with the *Special Load Notification to Captain (NOTOC)* to ensure he/she knows the cargo includes livestock and is aware of their special requirements.



**Figure 42.** Livestock crates parked on the tarmac ready to load onto the aircraft. Crates should be towed onto the tarmac just before they need to be loaded on the aircraft.



**Figure 43.** Livestock crates being lifted with a scissor lift to the main deck cargo door on a freighter aircraft.



**Figure 44.** A livestock crate being lifted up and rolled through the cargo door onto the main deck of a freighter aircraft.

## 9.7 INSTRUCTIONS TO THE CAPTAIN

The exporter's instructions regarding livestock management during the flight should be given to both the loadmaster and aircraft stock attendant in writing. The loadmaster gives these instructions to the aircraft Captain, and will ask the Captain to countersign a *Special Load Notification to Captain* (NOTOC) form. This ensures the Captain is aware that there are livestock on board and any specific requirements regarding their management during the flight.

The aircraft Captain invariably has vast aviation experience, but may not be aware that the aircraft has a cargo of livestock until shortly before boarding the plane, may not have flown with livestock before, and may not fully appreciate the importance of environmental control during the flight. Brief but clear written instructions from the exporter and the *Special Load Notification to Captain* are important, and should be reinforced with a verbal briefing from the stock attendant.

### Key instructions to the aircraft Captain

The aircraft's APU must be switched on to power the ECS and ventilate the cargo holds prior to loading any livestock.

Set the ECS to maintain temperature in the cargo holds in the range 10-26°C (ideally about 18°C).

Close the cargo doors as late as possible, just prior to departure.

During flight, turn lights in cargo areas down to an absolute minimum.

If landing at a hot location – during the last hour of the flight bring the temperature in the cargo holds down as low as possible.

The aircraft's APU must be switched on and ECS maintained during descent, throughout transit stops and at destination until all livestock are unloaded from the aircraft.

Open the cargo doors as soon as possible after arrival.



## 9.8 EXPORT DOCUMENTS

On completion of loading, the Australian Government veterinarian supervising the consignment issues an Australian Health Certificate and the air freight forwarder issues an Airway Bill.

As soon as the Health Certificate and Airway Bill are issued they should be scanned and emailed to the importer overseas. This enables customs formalities in the importing

country to be completed while the animals are in the air, allowing prompt release of the cargo after arrival.

The original Health Certificate and Airway Bill travel on the plane with the consignment. They are required for acceptance and release of the cargo at the destination airport.

### Key documents at loading

Document	Prepared by	Purpose
Aircraft load plan	The exporter and air freight forwarder in consultation	<p>The aircraft load plan has:</p> <ul style="list-style-type: none"> <li>the number of each type of crate;</li> <li>the number of animals and their expected weight in each tier of each crate; and</li> <li>where on the aircraft the crates will be loaded – main deck, lower cargo hold, tail position etc.</li> </ul> <p>The aircraft load plan is to ensure that the animals intended for export can be loaded within the aircraft's weight, pallet space and height constraints, and in compliance with ASEL stocking density requirements.</p> <p>It is a key planning document that should be prepared early in consignment planning – before any crates are ordered or animals are sourced for export. It should be updated when animals have been sourced and their weights are known more accurately.</p>
Trucking plan	The exporter	The trucking plan sets out the order in which animals will be delivered to the airport and their penning arrangement on the trucks. This allows orderly and efficient loading into aircraft crates at the airport.
Special Load Notification to the Captain (NOTOC)	The air freight forwarder	The NOTOC ensures the aircraft Captain is aware the cargo includes livestock and any specific requirements regarding their management whilst on board.
Health certificate	Australian Government veterinarian	Issued after loading to certify that the importing country animal health requirements have been met. The original goes with the livestock.
Packing list	The exporter	This is a list that, when required, individually identifies every animal in the consignment. Most often generated by scanning RFID eartags when animals are loaded for delivery to the airport. Is appended to the Health Certificate.
Permit to Export	Australian Government veterinarian	Issued after loading and given to the exporter or air freight forwarder, who pass it on to the Australian customs authorities.
Airway bill	The air freight forwarder	Issued after loading. It serves as a receipt of goods by the airline and a confirmation of the contract of carriage.

# 10. AIRCRAFT STOCK ATTENDANTS

## 10.1 ROLE AND RESPONSIBILITIES

The prime responsibility of the aircraft stock attendant is to protect the welfare of the livestock during the flight, and to ensure that unloading at the destination airport proceeds as smoothly as possible, with the least possible stress on the animals.

The aircraft stock attendant's responsibilities generally cease once the animals have been unloaded from the aircraft at the destination airport. However, the stock attendant may also be required to oversee transfer of the animals to trucks at the destination airport, and in some cases accompany them to unloading at the destination quarantine station or farm.

It is important that, prior to departure, the exporter provides the aircraft stock attendant with a clear brief setting out the extent of his/her role and responsibilities.

## 10.2 AIRLINE SECURITY CHECK AND VISA

All airlines require a security check for anyone other than airline crew travelling on a freighter. The stock attendant's name and a copy of his/her passport must be submitted to the airline for security clearance. This is normally done by the air freight forwarder. It is best to start security clearance procedures at least three weeks in advance, as this lead time is required by some airlines and clearance to travel on the aircraft may not be possible at short notice.

The need for a visa depends on where the stock attendant gets off the aircraft. It is important to check visa requirements early in the consignment planning process. If a visa is needed and cannot be obtained on arrival in the destination country, it must be obtained in advance.

## 10.3 WHAT TO TAKE

A mobile phone with international roam is essential. It should have phone numbers stored for key contacts, including the Australian exporter, the exporter's representative in the destination country (if there is one), and the importer. Key contacts in the overseas country should be given the stock attendant's mobile phone number, so they can contact the stock attendant if need be on arrival.

A high-visibility vest and steel-capped work boots are required for work on the airport tarmac in Australia and at many overseas airports. Appropriate clothing should be taken for weather conditions expected at the destination airport, as well as any transit stops. Light cotton work clothes are sufficient for stop-overs in the tropics. Heavy duty warm clothing may be required for delivery to northern hemisphere destinations during the winter months.

The stock attendant's tools of trade include a notebook, phone/camera and torch. The stock attendant should also have a credit card and sufficient contingency funds in case of unforeseen circumstances, including a delayed flight home. Some cash, preferably small value notes in the currency of the destination country, otherwise in Australian or US dollars – just sufficient to pay for a taxi, buy meals and similar minor expenses at destination without being dependent on the importer or exporter's representative. A money belt or pouch to keep valuables (passport, credit card and cash) secure on person and out of sight is strongly recommended.

The aircraft stock attendant should have a copy of the health certificate, just in case there are any queries from officials on arrival overseas.

There is little, if any, need for veterinary drugs or equipment during the flight. However, a basic vet kit should be considered if a stock attendant is to accompany animals to their end destination after unloading overseas. The importer might also arrange for veterinary supplies and/or equipment from Australia to be included on the flight for delivery with the stock. If so, an inventory of such items should be prepared and provided to the airline prior to departure. Temperature sensitive items must be appropriately packed in an insulated box with cooler blocks.

Valuables such as jewellery should be left behind. So too any material that might evoke cultural, religious or political sensitivities in the destination country. Take only what is needed and leave the rest behind.

All planes are well stocked with meals, nibbles, soft drink, juice, tea, coffee etc. There is no need to take any food for the flight.

### Stock attendant – what to take

High-visibility vest and steel-capped work boots

Mobile phone/camera with international roam and phone charger

Phone numbers for key contacts – exporter, importer and the exporter's representative in the destination country

Light cotton work clothes if there is a transit stop in the tropics

Work clothes for the weather expected at destination. Heavy duty warm clothing may be required during the northern hemisphere winter months

Torch, notebook, pen

A money belt or pouch to keep valuables (passport, credit card and cash) secure

Passport with visa (if required) to enter the destination country

Credit card with sufficient funds to get home in unforeseen circumstances

A small amount of cash, preferably small denomination notes in the currency of the destination country, otherwise in Australian or US dollars

Flight details and ticket for returning home



**Figure 45.** Be prepared for weather likely to be encountered during transit stops and at the final destination.

## 10.4 DEPARTURE FORMALITIES

The aircraft stock attendant should arrive at the airport at least two hours before departure in order to attend a safety briefing, obtain security clearance to go onto the tarmac and have his/her baggage scanned. Immigration formalities for departure from Australia are typically undertaken on the aircraft half an hour before take-off. The stock attendant simply needs to present his/her passport with a completed departure card.



# 11. IN-FLIGHT MANAGEMENT

### KEY POINTS

- Cargo hold temperatures must be closely monitored throughout the flight.
- Livestock travel best if they are disturbed as little as possible during the flight.

## 11.1 ENVIRONMENTAL CONTROL

A full plane load of livestock generates lots of body heat, water vapour and ammonia. Cattle, buffalo, alpaca, sheep and goats all rely on evaporative cooling to dissipate body heat, mostly with water vapour blown off from their lungs. If the temperature in a cargo hold increases, and there is high humidity, the animals are liable to heat stress. This is a significant animal welfare risk. It is therefore critically important to closely monitor cargo hold temperatures throughout the flight and during any transit stops.

An aircraft’s environmental control system (ECS) provides air supply, and controls temperature, humidity, noxious gases and air pressure for the livestock and crew on board. During flight, cold air from outside is bled from a compressor on each engine, then passed through a water separator to remove moisture, and a filter to remove particulate matter. The incoming air temperature is adjusted by regulating air flow and passing the air over heat exchangers. This ‘fresh air’ is then mixed with recirculated air and distributed to various zones within the aircraft. The crew can monitor and adjust the temperature in each cargo hold from controls in the cockpit.

Temperate breed cattle, sheep and goats travel best if the cargo hold temperature is within the range 10-26°C. A cargo hold temperature of about 18°C is ideal.

Table 3 provides a ‘rule-of-thumb’ assessment of heat stress risk. It assumes that humidity in the cargo hold is high and there are micro-climates within the hold where the local temperature is higher than shown on the aircraft’s sensors.

Ventilation systems vary from one freighter aircraft to the next. The tail end of the main deck is often a couple of degrees warmer than further forward. The cargo hold shape and presence of crates channel air flow along the sides of the main deck, with less air flowing over the top of crates at the ceiling. As a result, animals on the top deck of a multi-deck floor to ceiling livestock crate may be exposed to temperatures a couple of degrees higher than animals on the bottom deck.

Table 3. Heat stress risk

Cargo hold dry bulb temperature (°C)	
25°C or below	Safe
26-30°C	A cause for concern
More than 30°C	Critical concern

The aircraft Captain should be asked to set the cargo hold temperatures at about 18°C. Temperatures should be checked and recorded 30 minutes into the flight, an hour into the flight, two hours into the flight and at least once every two hours thereafter. The crew should also be asked to alert the stock attendant if the temperature in any cargo hold rises above a nominated threshold figure.

During the flight, livestock settle best if there is safety lighting only – a bare minimum above complete darkness is sufficient. The Captain should be asked to dim the cargo hold lights accordingly.



Figure 46. With a block of ceiling high crates, air flow is channelled down the sides of the aircraft hold (blue arrows), producing hot spots (red circles) between crates in the centre of the aircraft and at the ceiling. The temperature in these areas can be a couple of degrees hotter than at the outer sides of the crate. Where possible, multi-deck floor to ceiling crates should be interspersed with lower crates or empty pallet positions.

## 11.2 LIVESTOCK INSPECTION DURING FLIGHT

Livestock travel best if they are disturbed as little as possible during the flight. Regular monitoring of cargo hold temperatures is most important. Once a stock attendant is happy that temperatures in the cargo holds have stabilised, and there is regular temperature monitoring in place, it is best to leave the livestock undisturbed. Additional in-flight inspections should be the minimum necessary to check animal welfare, for example after severe turbulence and prior to descent.

The stock attendant with a consignment of livestock should carry a notebook and keep a record of key events and observations, from the time livestock are loaded onto the plane until they are unloaded at their destination. If there is a problem later in the flight, it can be difficult to remember exactly how events unfolded and what observations were made a few hours earlier. The notebook is a permanent record and prompt, for personal use only.



**Figure 47.** There is very limited access to livestock in netted crates on the main deck, and no access whatever to crates in the lower cargo holds.

## 12. TRANSIT STOPS

### KEY POINTS

- Some flights have a transit stop to refuel and/or change flight crew.
- While the aircraft is on the ground, environmental control in the cargo holds is critically important.

### 12.1 SHORT TRANSIT STOP

Long distance charter flights may have a transit stop to refuel and change flight crew. This might be in Darwin, Kuala Lumpur, Singapore or elsewhere in South-East Asia. If everything goes smoothly, the plane will be on the ground for 1½-2 hours.

For an aircraft fully loaded with livestock, a transit stop is a really critical time. Once a plane has landed, if preventive action is not taken, the temperature and humidity in the cargo holds can increase rapidly and soon reach critical levels. Environmental control is of paramount importance.

An hour prior to landing, the Captain should be asked to bring the temperature in the cargo holds down as low as possible. A full aircraft load of livestock generates a huge amount of metabolic body heat. It may be difficult to bring the cargo hold temperatures down much, but everything helps. The aim is to land with the least possible heat load in the cargo holds.

The aircraft's auxiliary power unit (APU) should be switched on and used to power the aircraft's environmental control system (ECS) whenever the aircraft is on the ground and there are livestock on board. This should be included in the written instructions to the Captain prior to departure, with a reminder from the stock attendant just prior to final approach.

Shortly after the aircraft stops at its park position, the main deck front door will be opened and steps pulled up for human access. If cargo will not be unloaded, and the APU and ECS are running, keeping the other cargo doors closed helps to maintain environmental conditions within the cargo holds.

If there is a crew change at the transit stop, after landing the flight crew will quickly disappear – their job flying the plane is done. All sorts of people may come onto the plane – cleaners, technicians, engineers and officials of various kinds. It can be difficult to know who is responsible for what, and how to get a simple thing done.



**Figure 48.** Air pumped onto the main deck to enhance ventilation during a short transit stop.

Ventilation to the cargo holds must be maintained whilst the aircraft is on the ground. In addition to the aircraft's APU, there may also be a portable APU parked on the tarmac, used to power the aircraft's ECS and/or pump air into the cargo holds (Figure 48). Arrangements for enhanced ventilation need to be made with the airline well in advance, to ensure the equipment required is ready and waiting when the aircraft lands.

With a full aircraft load of livestock on the ground in a tropical location, the aircraft's ECS can only be expected to keep the temperature and humidity in the cargo holds below critical levels. It is unrealistic to expect a significant reduction in cargo hold temperature. So, the sooner the aircraft takes off again, the better.

Whilst the aircraft is stationary, the stock attendant should check each crate on the main deck to ensure that animals are either on their feet or lying comfortably. It is not possible to check livestock in the lower cargo holds whilst the crates are still in the hold.



## 12.2 EXTENDED TRANSIT STOP

From time to time, there is a transit stop of several hours. This may occur for a number of reasons, including mechanical issues with the plane, weather delays, flight restrictions, crewing constraints and/or landing rights at the destination airport.

If an aircraft's ECS system is clearly not coping, and pushback for take-off is not imminent, removing some crates from the aircraft is strongly recommended. It is not necessary to take animals out of their crates. The crates (still netted down to their pallet bases) are simply lowered onto dollies and parked in a low-activity area nearby, with shade from direct sun and out of any rain. It is a relatively quick and straightforward process for cargo freight handlers, but needs someone with authority to make things happen. If a few crates are taken out, those that remain on board can be spaced out to enhance air flow over and around each remaining crate.

The airline representatives, agents and freight handlers at overseas airports often have little, if any, experience with Australian livestock, and don't appreciate the critical importance of environmental control in a stationary aircraft. A stock attendant with presence can make a real difference to the welfare of animals in the consignment.



**Figure 49.** Livestock crates offloaded onto the tarmac during an extended transit stop.

A long transit time may also occur if there are two or more flight legs and a few hours between connecting flights. If an extended transit time is known in advance, and water deprivation time for the completed journey may exceed the maximum allowed under ASEL, consideration should be given to providing water to the animals during their transit stop.



**Figure 50.** Drinking water being supplied to goats during an extended transit stop at Kuala Lumpur, en-route to the Middle East. Note the side inspection hatches built into the crate to allow access without opening the crate door and risking animal escape.

## 12.3 BIOSECURITY DURING TRANSIT STOPS

Some importing country health protocols and/or import permits place biosecurity restrictions on transit stops. A transit stop between the airport where livestock are loaded in Australia and the destination airport in the importing country may be banned outright. Or there may be specific conditions imposed to minimise disease risks – such as not being allowed to offload animals from the aircraft, or having to apply an insecticidal spray.

The exporter needs to be aware of any such restrictions during the early planning phase for the consignment, and must brief the aircraft stock attendant of any transit stop requirements prior to departure.

# 13. ARRIVAL AT THE DESTINATION AIRPORT

## KEY POINTS

- Arrival procedures vary greatly between destination airports.
- When the cargo net is taken off and the pallet base removed, an aircraft crate is much more fragile and must be handled with great care. This is especially so for double-deck cattle crates and multi-deck sheep/goat crates, because of their size, weight and higher centre of gravity.

## 13.1 FINAL APPROACH

If hot weather is expected at the destination airport, an hour prior to landing, the Captain should be asked to bring the temperature in the cargo holds down as low as possible. The aircraft's APU should be switched on and used to power the aircraft's ECS immediately after touch down. However, this may not be necessary if cold weather is expected at the destination airport – for example a flight to northern Asia or Europe during the northern hemisphere winter.

## 13.2 ARRIVAL PROCEDURES

On landing at the destination airport the aircraft stock attendant should systematically go through the main deck to check that the livestock in all crates are OK. Likewise, crates from the lower deck holds should be checked as soon as they are removed from the aircraft.

In most cases, the livestock crates will be promptly unloaded from the plane. They may be placed on the tarmac or moved on dollies to a cargo clearance area a short distance away. The cargo nets are then removed and the wooden crates taken off the pallet base. This generally happens quite quickly, with a flurry of activity shortly after the aircraft lands. The airline is interested in recovering the pallet bases and cargo nets and getting the aircraft away to its next destination without delay.

The next step is veterinary inspection and customs clearance by the relevant authorities in the destination country. This process varies enormously. If the airport receives livestock on a regular basis, and the Airway Bill and Health Certificate have been scanned and emailed through in advance, veterinary inspection and customs clearance may be a formality that involves little more than a cursory look at the animals and checking that the original documents are the same as those emailed in advance. However, if the airport has received few if

any livestock before, veterinary inspection and customs clearance can be slow and frustrating, with lots of officials and onlookers getting involved. It is important that the Australian exporter has a representative present who speaks the local language and has the presence and authority to sort out any administrative glitches.

The aircraft stock attendant needs to complete arrival formalities with the immigration authorities in the destination country. This will most likely require going through an arrival channel away from the cargo handling area, and may not allow access back to the cargo handling area.



**Figure 51.** Unloading livestock crates from the aircraft. There may be a large contingent of airport workers, officials and onlookers present.

## 13.3 TRANSFER OF RESPONSIBILITY FOR ANIMAL CARE

Depending on the consignment, the Australian exporter's responsibility for animal care may be transferred to the importer when crates are unloaded from the aircraft, or later, such as arrival at the post arrival quarantine facility or destination farm. Regardless of when responsibility for animal care is transferred, the exporter has a moral obligation to assist the importer with advice regarding safe delivery of the animals to their end destination.

Things can go awry after arrival if aircraft crates loaded with livestock are not handled carefully. When exporting livestock to a new market, or to a new and inexperienced importer, the Australian exporter should find out in advance how the crates will be handled after arrival, and provide guidance on safe crate handling.



**Figure 52.** Double-deck sheep crates being lifted by crane. This is a high-risk method of crate handling. Without spacer bars, the crane straps put inward pressure on the crossbars at the top of the crate, which are likely to break.

### 13.4 CRATE HANDLING AT THE AIRPORT

With the cargo net taken off and the pallet base removed, a livestock crate is more fragile and needs to be handled with great care. This is especially so for double-deck cattle crates and multi-deck sheep/goat crates, because of their size, weight and higher centre of gravity.

By the time of unloading at the destination airport, there may be minor damage to some crates, such as cracked timbers, which add to the importance of careful crate handling. Each crate should be checked for structural integrity, and ropes or strapping applied or running repairs carried out as necessary to any crate with damage likely to cause injury or allow escape.

The forklifts used to move livestock crates must be suitable for the task. They need a weight rating sufficient for the crates to be lifted. This is rarely of concern. However, the length of the forklift tines is often a problem. Forklift tines need to extend the full width of the crate being lifted. If not, the crate is less stable on the forklift, and there is a real risk the ends of the tines will push up through the floor of the crate. A standard aircraft pallet is 2.44 m wide, so the forklift tines need to be 2.5 m long. Most of the small forklifts used in aircraft freight handling depots have tines that only extend about

a metre under the crate. This is not long enough. Either tine extensions or a heavy duty forklift with long tines need to be arranged in advance.

Livestock crates must not be lifted by a crane with ropes or chains secured to the top of the crate. Nor should a livestock crate be lifted from above by a forklift positioned under a top bar. If the crate is lifted from above, the crate floor can collapse under the weight of the animals inside, causing injuries and animals to escape. Crates must be lifted from below.

The freight handlers at most overseas airports have little if any experience handling Australian livestock. The aircraft stock attendant should not be afraid to step in if there is rough crate handling with a high risk of crates getting damaged and/or animals being injured or escaping. The transition between aircraft and destination farm overseas is a critical step in the delivery chain, where a stockperson with good livestock handling skills, a cool head and authority can make a real difference.



**Figure 53.** A double-deck cattle crate about to be lifted onto a nearby flat-top truck. Note the extended forklift tines essential for reaching the full width of the crate.



**Figure 54.** A double-deck cattle crate being moved by forklift. With the cargo net taken off and pallet base removed, the crate must be handled with great care.



## 13.5 TRANSPORT FROM THE AIRPORT

Livestock can leave the arrival airport for their end destination in a number of different ways:

- Still in their crates, loaded onto flat top trucks.
- Transferred from their crates to a livestock truck at or nearby the airport.
- Let out of their crates into a quarantine area at or nearby the airport.

Livestock often leave the arrival airport still in their crates, loaded onto flat top trucks. With the cargo net taken off and pallet base removed, livestock crates are quite fragile. Careful crate handling and truck driving is essential. With rough crate handling, there is a risk of structural damage resulting in livestock injury or escape. The destination farm must have a system ready to unload the crates when the vehicles arrive.

Crate handling options overseas are limited for crates without a structural floor. They cannot be removed from the pallet base with livestock still inside, so cannot be lifted onto a flat top truck. Animals can only be released directly into a livestock truck, or into a livestock containment area.

If livestock are transferred to a livestock truck at the airport, this is best done in a customs yard or other secure area, so if an animal escapes it cannot roam freely onto the tarmac.



**Figure 55.** Cattle being lifted onto a flat top truck at the airport. Arrangements must be in place to lift the crates off the truck at the destination farm.



**Figure 56.** Cattle being transferred directly into purpose-built livestock trailers – very safe and secure.

## 14. ARRIVAL AT THE DESTINATION FARM OR QUARANTINE FACILITY

On arrival at their final destination, livestock exported by air are invariably tired from the journey. They should be unloaded into a spacious area with protection from the weather, provided with cool, clean drinking water and given good-quality pasture hay (or similar). They should then be left undisturbed 48 hours to rest.

If vaccination for diseases endemic in the destination country is required, such as for foot-and-mouth disease, sheep pox or Peste des petits ruminants (PPR), vaccination is ideally done immediately after the 48-hour post arrival rest period.



**Figure 57.** Unloading at the destination farm overseas.

## 15. REPORTING TO GOVERNMENT

The Australian Government requires an end-of-journey report on the health and welfare of all livestock exported by air. The end-of-journey report must be submitted in accordance with ASEL requirements, using LiveCorp's LIVEXCollect reporting platform.

# Appendices

Best practice for the export  
of livestock by air

# APPENDIX A

## AIR FREIGHT ACRONYMS AND CODES

APU	Auxiliary power unit on the aircraft.
ASEL	The Australian Standards for the Export of Livestock.
ASIC	Aviation Security Identification Card. Used to identify people who have passed a background check and can access secure areas of the airport unescorted.
AU	The IPPC code for Australia.
AWB	Airway bill.
CDL	Configuration deviation list. A list of aircraft equipment defects.
ECS	Environmental control system on the aircraft.
HT	The IPPC code for heat treated timber.
IATA	The International Air Transport Association – the trade association of the world’s airlines.
IPPC	The International Plant Protection Convention.
LAR	The IATA Live Animal Regulations.
LiveAir	The industry association for the Australian livestock export industry.
LIVEXCollect	The livestock export industry’s reporting platform to the Australian Government.
LNC	Livestock Notice of intention to export Consignment risk management plan.
MAWB	Master Air Waybill.
MEL	Minimum Equipment List for an aircraft.
MSN	Manufacturer’s serial number.
MT	Metric tonnes.
NOTOC	Special Load Notification to the aircraft Captain.
PMC	A general purpose flat pallet made from aluminium alloy and used as the base for livestock crates. Also known as a P6P.
P6P	A general purpose flat pallet made from aluminium alloy and used as the base for livestock crates. Also known as a PMC.
RFID	Radio-frequency Identification.
ULD	A ‘Unit load device’ – a pallet or container used to hold air freight.



# APPENDIX B

## EXAMPLE OF AN AIRCRAFT LOAD PLAN

	Number of crates	Crate type	Pen area m <sup>2</sup>	Internal height mm	Livestock	Average weight (kg)	ASEL head allowed	Heads to load	Total heads	Crate tare (kg)	Livestock wt (kg)	Crate gross (kg)	Total (kg)
Main Deck	7	Cattle double	5.0 (upper)	1400	Heifer (light)	380	4.9	5	35	825	1,900	5,005	35,035
			6.2 (lower)	1400	Heifer (light)	380	6.1	6	42		2,280		
	10	1800 cattle	6.2	1650	Heifer (heavy)	460	5.2	5	50	525	2,300	2,825	28,250
	12	1600 cattle	6.2	1450	Heifer (medium)	400	5.8	5	60	475	2,000	2,475	29,700
Tail	1	1600 cattle	6.2	1450	Heifer (medium)	400	5.8	3	3	475	1200	1,675	1,675
Belly	8	1600 cattle	6.2	1450	Heifer (medium)	400	5.8	5	40	475	2,000	2,475	19,800
	<b>38</b>								<b>230</b>				<b>114,460</b>

An example aircraft load plan for a consignment of 230 Holstein heifers to be loaded on a 747-400 freighter, with a cargo weight limit of 115 MT.

# APPENDIX C

## TIMBER PEN FIT FOR PURPOSE CERTIFICATE

This is to certify that the pens listed below are designed to comply with both the *IATA Live Animal Regulations* and the *Australian Standards for the Export of Livestock*, and are fit for purpose for the following shipment:

LNC Number:	Shipment date:       /       /	MAWB #:
-------------	--------------------------------	---------

Importing country:
--------------------

	Example	Pen type 1	Pen type 2	Pen type 3	Pen type 4
<b>Pen type</b>	Cattle 160 cm				
<b>Number of crates</b>					
<b>Pallet type</b>	PMC				
<b>Forklift suitable</b>	YES or NO				

Fit for purpose checklist completed and attached: YES or NO

Strapping instructions attached: YES or NO

Plywood and DAR coniferous timber are present: YES or NO

The wood has been treated in compliance with International Plant Protection Convention (IPPC) standards for heat treatment – a core temperature of 56°C or above for at least 30 minutes: YES or NO

## DECLARATION

**Certified by:**

Name:	Date:       /       /
-------	-----------------------

Signature:
------------

Manufacturer's business name:	Phone:
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# APPENDIX D

## ALUMINIUM PEN FIT FOR PURPOSE CERTIFICATE

This is to certify that the pens listed below are designed to comply with both the *IATA Live Animal Regulations* and the *Australian Standards for the Export of Livestock*, and are fit for purpose for the following shipment:

LNC Number:	Shipment date:      /      /	MAWB #:
Importing country:		

	Example	Pen type 1	Pen type 2	Pen type 3	Pen type 4
<b>Pen type</b>	Cattle 160 cm				
<b>Number of crates</b>					
<b>Pallet type</b>	PMC				
<b>Forklift suitable</b>	YES or NO				

Fit for purpose checklist completed and attached: YES or NO

Strapping instructions attached: YES or NO

## DECLARATION

**Certified by:**

Name:	Date:      /      /
Signature:	
Manufacturer's business name:	Phone:



LiveCorp  
PO Box 1174  
North Sydney NSW 2059

Meat & Livestock Australia  
PO Box 1961  
North Sydney NSW 2059



**LIVECORP**  
THE AUSTRALIAN LIVESTOCK  
EXPORT CORPORATION

