

# Mortality Investigation Report 68 Cattle exported by sea to Brunei Darussalam and Sarawak in April 2017

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## Summary

On 27 April 2017, South East Asian Livestock Services (SEALS) exported 896 slaughter and 340 breeder cattle by sea to Brunei Darussalam and Sarawak. The cattle travelled on the maiden voyage of a new livestock export ship. The journey was completed in 8 days and discharged at Brunei Darussalam and Sarawak on 3 and 4 May 2017 respectively.

A mortality rate of 7.69 per cent (95 animals) was experienced in this consignment. The reportable mortality level for cattle exported by sea on voyages of less than ten days is 0.5 per cent as prescribed by the *Australian Standards for the Export of Livestock* (ASEL).

The mortalities were the result of cattle slipping over and not being able to rise (downers). Affected animals were sternally recumbent with their hind legs splayed. The on board Australian Government Accredited Veterinarian (AAV) assessed their prognosis as dire and consequently euthanased them. A total of 77 mortalities occurred during the voyage and a further 18 were recorded at discharge at the first port.

Slippery deck floors were the cause of the falls and subsequent mortalities. Although the floors had been fitted with a non-slip layer, they proved unsuitable for livestock. The decks had been inspected by the Australian Maritime Safety Authority (AMSA) before granting the Australian Certificate for the Carriage of Livestock (ACCL). Vessels cannot transport livestock without an ACCL being issued by AMSA following inspection of the functionality and maintenance of all livestock services. While AMSA requires that all livestock export ships have non-slip flooring, there is no standard for the type of surface used; or criteria against which an assessment can be made of whether it is fit for purpose.

A non-slip epoxy paving paint was applied to the floors of the vessel. According to the manufacturer, this product is widely used in the marine industrial field; however, it has not previously been used in Australian livestock export ships. Additionally, a secondary coat consisting of a modified epoxy paint was applied over the top of the non-slip surface, reducing its functionality.

Following this reportable mortality, AMSA revoked the ACCL for the vessel and consequently it could not be used for the export of livestock. The flooring has been remediated, which involved grinding and cleaning the original surface and applying a different non-slip epoxy paint (from the same manufacturer but containing a coarser aggregate) with no overcoat. The ship owners also improved drainage from the livestock spaces. AMSA undertook an independent investigation into this incident and issued an ACCL on 4 September 2017 after inspecting the vessel for compliance with *Marine Order 43 (Cargo and cargo handling – livestock) 2006*.

## Department Actions

The department will consider applying the following additional conditions to the next livestock export consignment using the same vessel:

1. An AAV must accompany the livestock.
2. The class of livestock must be limited to heifers, steers and young bulls less than 400 kg bodyweight.
3. The voyage must be less than 10 days' duration.
4. Bedding must be loaded onto the vessel, at a minimum quantity of 25 m<sup>3</sup> for every 1000 m<sup>2</sup>. (Bedding is not required under ASEL on voyages shorter than 10 days).

Additionally, the department has undertaken the following actions:

5. Shared details of this reportable mortality with industry, and suggested that information could be made available to livestock exporters regarding effective non-slip flooring for live export ships.
6. As part of the Australian Standards for the Export of Livestock (ASEL) review, additional conditions have been proposed for maiden voyages of new livestock export ships.

## **Information reviewed**

The department reviewed the following information:

1. Email correspondence from the exporter.
2. Daily Voyage Reports from the AAV.
3. Email correspondence from regional Department Veterinary Officers (DVOs).
4. Non-slip paint testing report from the shipbuilder, including photographs.
5. Mortality Report from the on board AAV, Master of the vessel and Chief Officer.
6. Email correspondence from the on board AAV.
7. End of Voyage Report from the on board AAV.
8. Report from the Master of the vessel.
9. Email correspondence from AMSA.
10. Mortality Report from the exporter.
11. Photographs of the deck flooring before, during and after remediation.
12. Reports from the owner/operator of the vessel and shipbuilder containing details of their investigation and remediation activities.
13. Specifications of non-slip epoxy paving paints from the product manufacturer.
14. Data on non-slip and friction testing of different floor surfaces.

## **Background**

A review of the department's published mortality reports (dated back to 2006), reveals a small number of cases in which flooring contributed to cattle mortalities. In 2006 (mortality report 5), cattle suffered from lameness and secondary leg infections, most likely caused by flooring that was too abrasive, and wet. In 2007, there was a cluster of three incidents (mortality reports 12, 13 and 14) involving the same vessel. Cattle sustained injuries after slipping and falling both during the voyage and at discharge, which was attributed to slippery 'worn down' flooring.

SEALS are experienced in exporting cattle by sea to the South East Asian market. They have had three other reportable mortalities recorded in cattle exported by sea to Brunei Darussalam and Vietnam (reports 41, 50 and 55).

## **Investigation findings**

### **The Livestock**

The consignment consisted of the following cattle:

1. 20 breeder bulls averaging 400 kg.
2. 320 breeder heifers averaging 330 kg.
3. 178 feeder steers averaging 370 kg.
4. 718 slaughter cows averaging 420 kg.

### **Preparation in the registered premises**

The Registered Premises (RP) used for this consignment is located in Katherine in the Northern Territory and is routinely used to prepare livestock for export. The cattle arrived at the RP between 4 and 22 April 2017 and were held there until 26 April 2017. During this period, the weather was mostly fine with a maximum

temperature of 36°C and a few days of rain on 12, 13 and 14 April 2017 (Bureau of Meteorology, 2017). A total of 1 240 head were examined by an AAV at the RP on 25 April 2017 and all were assessed as fit and healthy for export; however two animals were subsequently euthanased due to injuries and another was rejected for health reasons. ASEL standards were met for preparation of livestock at the RP. On 26 April 2017, 1 237 cattle were trucked to Darwin for loading.

## **The vessel**

The vessel is a purpose built livestock export carrier and this was its first voyage.

## **Loading onto the vessel**

The vessel was 70 per cent loaded and had the capacity to take approximately 400 additional cattle. Loading was completed in 5.5 hours and was conducted in accordance with ASEL standards. There were no issues relating to weather or delays. There was one mortality during loading in a steer that was euthanased following injuries (reducing the total number of animals loaded to 1 236). Excess fodder (equivalent to 10 per cent above ASEL specifications) was loaded onto the vessel. While there is no ASEL requirement for bedding on short-haul voyages, 10 MT of sawdust was also carried on board.

A DVO inspected the consignment aboard the vessel and observed cattle losing their footing when pens became wet with urine and faeces, although he was aware that it is not uncommon for cattle to slip during inspections, particularly when they are nervous. The on board stockman and exporter representative also flagged concerns about the floor surface; however, they expected the incidence of slips and falls to resolve once the cattle settled down.

## **Conditions during the voyage**

As this was the first voyage of a new vessel, an experienced on board AAV was engaged for this shipment and was responsible for managing livestock health and welfare and reporting to the department. An accredited stockman also travelled with the consignment and worked closely with the AAV. Sea conditions were rough with heavy rain on Day 1 of the voyage, which eased to moderate and cloudy on Day 2, and slight and cloudy from Day 3 onwards. The temperature ranged from 27 to 34°C and humidity fluctuated between 77 and 86 per cent. The cattle consumed an average of 8.44 kg per head per day of fodder, plus chopped hay, and 30.78 L per head per day of water respectively. The decks were reportedly dry throughout the journey with the addition of extra bedding.

## **Mortalities and treatments**

Cattle were losing their footing from the start of the voyage and it was evident to the AAV that the deck surfaces were too smooth. The situation was exacerbated by the rough sea conditions for the first two days. Affected animals were observed to scramble, slip and fall and were subsequently unable to rise. The AAV advised that the cattle could not get sufficient purchase on the flooring to get back on their feet.

In the morning of 27 April 2017 (Day 1), extra sawdust and fodder (used as bedding) was put in all pens. Efforts were made to move cattle out of pens containing downers and record ear tag numbers; however, these activities stressed nearby animals causing more to slip and fall. The AAV, accredited stockman and Chief Officer made the decision to minimise contact with livestock until they had settled down. The first mortalities were recorded on 28 April 2017 and the consignment became a notifiable incident on 29 April 2017. Although seas were calmer by the third day, cases continued for the remainder of the voyage reaching a total of 77 prior to discharge (see Table 1 below). Of the 95 mortalities, 90 occurred in animals weighing more than 400 kg.

Almost all affected livestock were euthanased, however, five mortalities were listed as 'natural causes'. The AAV advised all but one of these animals was found sternally recumbent with splayed hind legs, suggesting they too were downers. At discharge, bags of fodder were strategically placed along laneways to enable cattle to get their footing. Despite these measures, a further 18 mortalities occurred during discharge of slaughter cows and feeder steers at the first port due to slips and falls. Unloading was performed steadily and took approximately 9.5 hours to complete. The AAV stated that only a small number (two cows) required additional

care at the feedlot in the importing country. There were no mortalities in breeder livestock discharged at the second port.

<b>Date</b>	<b>Voyage Day</b>	<b>Number of mortalities</b>	<b>Cause of mortalities</b>	<b>Comments from the on board AAV</b>
27/08/2017	1	0		The deck surface on all decks is too smooth not allowing cattle to obtain footing resulting in cattle scrambling to stand and slipping over. So far 14 cattle (13 cows) are down with splayed legs. Putting extra sawdust in all pens with downer cattle.
28/04/2017	2	5 cows	1 cow mortality listed as natural causes; the rest were downers that were euthanased.	Total number of cattle down with splayed hind legs is now 30 (less 4 euthanased).
29/04/2017	3	16 cows 3 steers 2 heifers	All were downers that were euthanased.	Cattle have settled considerably but new cases of cattle going down still occurring but at a slower rate. This voyage became a notifiable incident with the submission of this daily report.
30/04/2017	4	13 cows	All were downers that were euthanased.	Cattle have settled but cattle are still going down. Since the afternoon inspection and this morning's inspection a further ten cattle are down.
01/05/2017	5	3 steers 5 cows 3 heifers	1 cow mortality listed as natural causes; the rest were downers that were euthanased.	Seven cattle found down in sternal recumbency with hind legs splayed on morning inspection today (01/05) that were standing on afternoon of 30/04.
02/05/2017	6	14 cows	1 cow mortality listed as natural causes; the rest were downers that were euthanased.	Discharge has the potential to be a massive debacle unless performed steadily and carefully. The floors of aisles and pens adjacent to the discharge ramps are to be covered with full interwoven fodder bags to give the exiting cattle a secure footing.
03/05/2017	7	1 cow	Listed as natural causes.	The afternoon deck inspection (02/05) found a further seven cows down in sternal recumbency with hind legs splayed. All these cows were standing prior to this. All these cows plus another five cows were found down in sternal recumbency with their hind legs splayed on the morning inspection today (03/05).
03/05/2017	7 at discharge	18 cows 1 steer	12 cows were downers prior to discharge (as stated in the entry above). 11 were euthanased and 1 was listed as natural causes. 17 cows and 1 steer were discharge mortalities. These animals were euthanased as they fell and were unable to rise again during discharge.	

Date	Voyage Day	Number of mortalities	Cause of mortalities	Comments from the on board AAV
04/05/2017	8	0		Don't expect discharge of bulls and heifers to be a problem as they are younger and lighter.

## Exporter's Actions

On 27 April 2017, SEALS contacted the ship owner to advise them of the flooring problem and remained in regular contact with them throughout the voyage. Once discharge was complete, the ship sailed directly to a shipyard to undergo remediation of the floors. SEALS were responsive to the department's requests for information and submitted details of initial non-slip paint testing on 4 May 2017 and a comprehensive mortality report on 22 May 2017.

SEALS arranged for two representatives to be at the first port to assist with discharge. One travelled to the feedlot to ensure livestock settled in appropriately and to follow up on the two cows identified by the AAV as requiring further management. The other representative continued on to the second port to assist with the final discharge. SEALS advised that if the vessel is used for another voyage, they will use the same on board AAV for consistency. The AAV indicated that the amount of bedding in each pen would be doubled from the outset, and hospital areas would have a thick pad, probably consisting of full sawdust bags placed in a patchwork pattern.

## **Cause of the incident**

The non-slip flooring on the vessel was composed of a 'high build' epoxy paving paint. Data from the manufacturer indicates that the paints performed well in standardised friction and non-slip tests and offered similar profiles to competitor products. The range includes epoxy paints containing finer (0.4 to 0.8 mm) and coarser (0.6 to 1.2 mm) aggregates with the latter providing greater non-slip capability. The decision was made to use the finer (0.4 to 0.8mm) aggregate paint on this ship as there were concerns that a coarser finish would be too abrasive for cattle standing or lying down on the decks. Additionally, a 'surface tolerant' modified epoxy paint was applied as an overcoat to improve physical strength and chemical resistance. During their investigation, the shipbuilder found that this overcoat reduced the function of the underlying non-slip layer.

The vessel has undergone remediation of all deck flooring constituting pen space and alleyways. The original surface was prepared by grinding and cleaning and then the coarser aggregate (0.6 to 1.2mm) non-slip epoxy paint was applied with no overcoat. All stages of the process were overseen by the paint manufacturer and a licenced shipyard inspector. The repaired surface has a superior non-slip profile, and has been subject to testing by the shipbuilder.

Following the remediation work, the vessel was inspected by AMSA. It then returned to dry dock to undergo further repair. The ship owners made improvements to the deck drainage system, increasing pipe diameter and adding a number of wells. Cut-off valves were also fitted to water bowls, and revisions were made to water access points, which should facilitate watering of any recumbent animals on future voyages.

## Australian Maritime Safety Authority Evaluation of the Vessel

In accordance with *Marine Order 43*, AMSA has undertaken a full investigation into this reportable mortality and will prepare a report with their findings. They inspected the vessel and issued a new ACCL on 4 September 2017 allowing it to be used for future livestock export consignments.

## Conclusions

The department concluded that the cause of this mortality event was ineffective non-slip flooring in a new livestock export ship.

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**Last reviewed:**

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