



Australian Government  
Department of Agriculture

# Mortality Investigation Report 45

## Cattle exported by sea to Japan in May 2013

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February 2014



## 1. Summary

On 25 May 2013, two consignments of cattle were exported on the same vessel from Australia to Japan.

There were 18 mortalities in one consignment of 1260 cattle, a mortality rate of 1.43 per cent. This exceeds the reportable mortality level of one per cent for cattle on voyages of ten days or greater duration as prescribed by the *Australian Standards for the Export of Livestock* (ASEL). This consignment was exported by Elders International Australia and is the subject of this report. In the other consignment of 600 cattle, there were four mortalities, a mortality rate of 0.67 per cent.

According to the information available none of the 18 cattle that died were identified as being sick or injured before death. No definitive cause for the mortalities could be determined. A combination of bovine respiratory disease (BRD), cool weather before export resulting in poor acclimatisation to the high temperature and humidity during the voyage and rough shipping conditions may have contributed to the mortalities.

## 2. Information Reviewed

The department investigated the mortalities by reviewing the following information:

- Report from the exporter
- End of voyage report, daily voyage reports and additional information from the accredited stockman who accompanied the consignment onboard the vessel
- Documents from the Australian Government Accredited Veterinarian (AAV) who prepared the consignment.
- Report from the master of the vessel
- Report from Australian Maritime Safety Authority (AMSA)
- Documents from the regional Department of Agriculture veterinary officer (DVO)
- Records from the registered premises
- The department's records from previous and subsequent voyages.

## 3. Background

This reportable mortality incident is the third recorded in a consignment of feeder cattle exported to Japan since the introduction of ASEL in 2005. The previous two incidents are described in [Mortality Investigation Report 44: Cattle Exported to Japan in January 2013](#) and [Mortality Investigation Report 43: Cattle Exported to Japan in March 2012](#). Each incident has occurred on a different vessel.

## 4. Investigation Findings

### The Exporter

The exporter of this consignment is experienced in preparing feeder cattle for Japan and has a history of low mortality voyages. In previous consignments when mortalities have been recorded they have ranged between one to six animals. From February 2005 until May 2013 the company has exported a total of 96 consignments of feeder cattle to Japan. During this period the total mortality rate was 0.09% (101 mortalities out of 109,581).

### The Livestock

The cattle in the consignment were:

- Angus crossbreed
- approximately 8 – 12 months of age
- 248 - 298 kg in weight
- a body condition score of 2.5 - 3 out of 5
- covered by medium winter coats (around 2cm).

### Preparation in the registered premises

The cattle were sourced from twenty properties and assembled at one registered premises from 2 May 2013 to 25 May 2013. The registered premises has been used to prepare feeder cattle for export to Japan for more than 70 consignments since 2005.

Weather conditions in the registered premises were cold during the preparation period. During the last 10 days of pre-export preparation minimum temperatures were as low as 4.5°C (BOM, 2013). The highest maximum temperature during this period was 18.2°C(BOM, 2013). During pre-export preparation, thirteen cattle were rejected; of these ten did not meet importing country requirements, two were rejected due to injury and one due to poor appetite.

An AAV inspected the cattle during pre-export quarantine on 22 May 2013. A DVO inspected the cattle on 23 May 2013. The cattle were observed to be healthy with no animals rejected or needing further attention. Permission to leave for loading was issued on 24 May 2013.

### Loading onto the vessel

A DVO supervised loading. No cattle were rejected during loading, which started at 7:20 am and was completed by 12:30 pm. The exporter's consignment of 1260 cattle was loaded onto Decks 1, 2 and 3 of the vessel. The vessel has four decks with deck one being the lowest and deck four being the highest.

### Mortalities and treatments during the voyage

Eighteen cattle died in the consignment of 1260, between days four and eight of the 18 day voyage, with the majority of deaths occurring on days four and five.

Stocking density and mortality percentage by deck is shown in Table 1. The stocking densities were in accordance with ASEL requirements. Mortalities occurred on all decks except deck two. Sixteen mortalities in this consignment occurred on deck three and two mortalities occurred on deck one. Cattle in the other consignment were housed on deck four.

Details of treatments and mortalities that occurred during the voyage is shown in Table 2.

**Table 1 – Stocking density and mortality percentage by deck**

Deck	Stocking density (m <sup>2</sup> per animal)	Mortality %
1	1.16	0.63
2	1.15	0
3	1.16	2.67
4	1.15	0.67

Daily voyage reports (DVR) submitted by the accredited stockperson on board, did not record any health or welfare issues before mortalities occurred. Treatments were recorded on the DVRs but no clinical signs were described.

Post mortems were completed on most of the mortalities, and images from the post mortems were provided to the department and the exporter. The exporter consulted with two cattle veterinarians, including an industry specialist feedlot veterinarian during the voyage. Based on the information available several differential diagnosis were suggested including trampling due to rough seas, clostridial diseases and peracute pneumonia/bovine respiratory disease (BRD).

As shown in Table 2 many cattle were treated with antibiotics for BRD and some animals were treated for pink eye, swollen leg and traumatic injury. Recommendations from the veterinarians consulted by the exporter included preventative antibiotic treatment. The antibiotics were given at

the recommended dose and the stockman tracked the progress of treated cattle. The exporter was in daily contact with the accredited stockman on board. At the time the mortalities occurred the exporter was also in regular contact with the department.

**Table 2 - Chronology of treatments and mortalities during the voyage**

Day	Daily Mortalities	Cumulative Mortality	Cumulative Mortality %	Treatments/Comments
0	0	0	0.00%	1260 cattle loaded in Brisbane.
1	0	0	0.00%	
2	0	0	0.00%	
3	0	0	0.00%	
4	7	7	0.55%	7 mortalities on deck 3, pen 7 (2), 17, 18, 19, 30 and 31. 7 animals on deck 3 treated with antibiotics for BRD. 1 animal treated with antibiotics for eye infection.
5	8	15	1.19%	7 mortalities on deck 3, pen 4,7,13, 19, 21, 24 and 34. 1 mortality on deck 1 pen 16. 3 animals on deck 2 treated with antibiotics for BRD. 20 animals on deck 3 were treated with antibiotics for BRD and one was treated with antibiotics for a swollen leg.
6	1	16	1.27%	1 mortality on deck 3, pen 24. 24 animals on deck 3 were treated with antibiotics for BRD.
7	0	16	1.27%	7 animals on deck 3 treated with antibiotics for BRD. 1 animal on deck 1 treated with antibiotics for pink eye. 4 animals on deck 2 treated with antibiotics for BRD.
8	2	18	1.43%	2 mortalities on deck 3, pen 21 and 34. 1 animal on deck 1 treated with antibiotics for a swollen leg. 10 animals treated with antibiotics on deck 3 for BRD. 3 animals treated with antibiotics on deck 2 for BRD.
9	0	18	1.43%	5 animals on deck 3 treated with antibiotics for BRD. 5 animals on deck 1 treated with antibiotics for BRD and 1 treated with antibiotics for pink eye.

Day	Daily Mortalities	Cumulative Mortality	Cumulative Mortality %	Treatments/Comments
10	0	18	1.43%	10 animals on deck 3 treated with antibiotics for BRD. 1 animal on deck 1 treated with antibiotics for BRD and 1 animal treated with antibiotics for a cut shoulder.
11	0	18	1.43%	6 animals on deck 3 treated with antibiotics for BRD. 1 animal on deck 2 treated with antibiotics for BRD.
12	0	18	1.43%	8 animals on deck 3 treated with antibiotics for BRD. 1 animal on deck 2 treated with antibiotics for BRD. 1 animal on deck 1 treated with antibiotics for BRD.
13	0	18	1.43%	1 animal on deck 3 treated with antibiotics for BRD. 1 animal on deck 1 treated with antibiotics for cut shoulder
14	0	18	1.43%	1 animal on deck 1 treated with antibiotics for BRD
15	0	18	1.43%	1 animal on deck 3 treated with anti-inflammatory. 1 animal on deck 3 treated with antibiotics for BRD.
16	0	18	1.43%	No treatment
17	0	18	1.43%	No treatment
18	0	18	1.43%	Unloading commenced

### Post mortem findings

The accredited stockmen on board conducted post mortems under direction from a registered veterinarian on most of the mortalities. All but one of the post mortem reports describe a history of sudden death with some purple discolouration of the lung. The diagnosis for each case was BRD. The other post mortem report describes no abnormal findings and a diagnosis of stress.

### Conditions during the voyage

Throughout the voyage the wet bulb temperatures on all decks ranged between 20°C and 30°C and the relative humidity ranged between 69% and 86% (Table 3). Temperatures varied during the voyage and were hottest during day three to eleven. The mortalities were clustered around days four and five following a steady rise in temperature from the time of departure. Rough shipping conditions were noted during the first half of the voyage.

**Table 3 - Wet bulb temperature and humidity during the voyage for Decks 1 to 4** (source: stockman’s daily voyage reports)

Day	Deck 1		Deck 2		Deck 3		Deck 4		Daily Mortality
	Temp	Hum	Temp	Hum	Temp	Hum	Temp	Hum	
1	23	76	23	76	20	75	20	75	0
2	23	70	22	69	23	70	23	70	0
3	25	77	24	70	25	77	24	77	0
4	27	78	27	78	27	78	26	78	7(deck 3)
5					27	78	28	79	7(deck 3) 1(deck 1)
6	29	86	29	86	29	86	28	85	1(deck 3)
7	28	85	28	85	28	85	28	85	0
8	29	86	29	86	29	86	29	86	2 (deck 3)0
9	28	85	28	85	28	85	28	85	0
10	28	85	28	85	27	85	28	85	0
11	30	86	30	86	29	86	29	86	0
12	29	86	29	86	29	86	29	86	0
13	29	86	30	86	29	86	29	86	0
14	28	85	28	85	28	85	29	86	0
15	28	85	28	85	28	85	29	85	0
16	25	84	25	84	25	84	24	85	0
17	25	84	25	84	24	84	24	84	0
18	25	77	24	77					Discharging Shinmoji
19	25	77	24	77					
20									Discharging Kobe

The stockman’s daily report and master’s report indicate that 17 of the mortalities were due to pneumonia/bovine respiratory disease and one was due to stress. The majority of mortalities (14) occurred in cattle originating from one of two properties. Nine of the mortalities from one property were lighter cattle that were recently weaned and approximately eight months of age at the start of pre-export quarantine.

The heat stress threshold is the maximum wet bulb temperature at which body temperature can be effectively controlled by the animal. The mortality limit is the wet bulb temperature at which the animal will die. For Angus crossbreed cattle the heat stress threshold is 30°C and the mortality limit is 33.2°C (Maunsell Pty Ltd, 2003). Although these temperatures were not reached during the period of cattle mortalities, the temperatures recorded on the daily reports indicate there was a steady increase in wet bulb temperatures during the first four days of the voyage from 20 to 27 °C with humidity over 70%.

According to the master's and stockman's report, the ship encountered hot weather conditions with high humidity and rough seas at the beginning of the voyage. In response to high heat and humidity, deck washing commenced on day five. Fresh water supply was provided ad lib and ventilation was operating at maximum capacity.

### **Feed and water**

From day three until the final day of the voyage, cattle consumed an average of at least 5.8 kg fodder/animal. This meets the ASEL-prescription for a minimum feed allowance of 2.0% of live weight per animal per day. On the first two days of the voyage, the cattle consumed less than this amount. This has previously been noted to be a normal time frame for cattle to acclimatise to the onboard environment. The feed provided to the cattle during the voyage was the same feed that was provided during the preparation period in the registered premises.

The watering system was by manual supply into large troughs with total stock water usage measured separately and reported daily. The vessel had onboard storage in excess of 600 MT of fresh water and reverse osmosis water production plant that is capable of producing in excess of 25 MT of fresh water daily. The master and stockman reported that all cattle had sufficient water available at all times.

### **Discharge**

Discharge of cattle at Shinmoji and Kobe port was unremarkable.

## **5. Australian Maritime and Safety Authority Evaluation of the Vessel**

The Australian Maritime Safety Authority (AMSA) investigates vessels when the total voyage mortality reaches at least 1%. Following the vessel's return from Japan, AMSA carried out a livestock preloading inspection at Brisbane and no deficiency was recorded. The ship also completed an annual Australian Certificate for the Carriage of Livestock (ACCL) inspection on 3 August 2013 with no deficiency recorded.

The AMSA investigation reported that there is no evidence of any breakdown of shipboard machineries during the voyage that contributed to the high mortality. In addition, since this voyage the ship has undertaken another six voyages with no incident of high mortality.

## **6. Conclusions**

The investigation did not find any information to link the mortalities to the preparation of the cattle in the registered premises or the loading of the vessel. AMSA did not identify any deficiencies with the vessel. The cattle were prepared and loaded in accordance with ASEL requirements, ate well during the voyage and were given access to adequate amounts of feed and water.

The investigation could not determine the cause of the mortalities. It is considered likely that a combination of bovine respiratory disease, cool weather before export resulting in poor acclimatisation to high temperature and humidity during the voyage, and rough shipping conditions may have contributed to the mortalities.

## 7. Actions

The department applied the following conditions to the exporter's next consignment to Japan:

1. An AAV accompanied the consignment to report on the health and welfare of the livestock
2. The cattle were provided with an additional 10% space above that required by the ASEL.
3. Additional detail was provided to the department in the travel and load plan.
4. Cattle were vaccinated according to the manufacturer's recommendation with a vaccine against *Mannheimia haemolytica* (to protect against BRD).

This consignment departed Brisbane on 3 July 2013. Four mortalities occurred during the voyage (mortality rate 0.36%).

## 8. References

Toowoomba, Queensland, May 2013, Daily Weather Observations. Australian Government Bureau of Meteorology (BOM)

<http://www.bom.gov.au/climate/dwo/201305/html/IDCJDW4126.201305.shtml> viewed 4 June 2013

Maunsell Australia Pty Ltd. 2003. *LIVE.116 Development of a heat stress risk management model*. Sydney: Meat and Livestock Australia.