



Australian Government
**Department of Agriculture
and Water Resources**

Mortality Investigation Report 51

Cattle and sheep exported to Israel and Jordan in January 2014

November 2015



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Summary

On 18 January 2014 Wellard Rural Exports Pty Ltd (Wellard) exported a consignment of cattle and sheep from Australia to Israel and Jordan.

During this voyage, 165 mortalities were recorded from the 6 000 cattle loaded (2.75 per cent mortality) and 1654 mortalities were recorded from the 42 550 sheep loaded (3.89 per cent mortality). This exceeds the reportable mortality level of one per cent for cattle on voyages of 10 days or greater duration and two percent for sheep, as prescribed by the *Australian Standards for the Export of Livestock* (ASEL).

During the voyage, the ship experienced mechanical failure, which slowed its progress and significantly extended the length of the voyage. Additional fodder of a different composition was loaded en route to ensure sufficient fodder was available for the remainder of the journey.

The investigation determined the cause of the majority of mortalities was ruminal acidosis as the result of a sudden change in fodder. Ruminal acidosis (also referred to as rumen lactic acidosis, grain overload, grain poisoning and acute indigestion) develops in sheep and cattle that have ingested large amounts of unaccustomed feeds rich in ruminally fermentable carbohydrates (RAGFAR 2007).

1. Purpose

To report on the investigation into the cause of mortalities in cattle and sheep exported by sea to Israel and Jordan and to determine if any action is required to reduce the likelihood of a recurrence.

2. Information reviewed

The Department of Agriculture investigated the mortalities by reviewing the following information:

- Report from the exporter
- End of voyage report and daily reports from the shipboard Australian Government Accredited Veterinarian (AAV)
- Records from the AAV who prepared the consignment
- Report from the Master of the vessel
- Information provided by the Australian Maritime Safety Authority (AMSA)
- Records from the regional departmental veterinary officer
- Records from the registered premises
- Departmental records.

3. Background

On 18 January 2014, Wellard Rural Exports Pty Ltd (Wellard) exported a consignment of cattle and sheep from Fremantle, Western Australia to Eilat, Israel and Aqaba, Jordan.

During the voyage, the ship experienced mechanical failure, extending the length of the journey. Additional fodder was loaded to meet fodder requirements for the extended journey.

The mortality rates for the voyage exceeded both the cattle and sheep reportable mortality levels. The reportable mortality levels as described by the *Australian Standards for the Export of Livestock (ASEL)* are one per cent for cattle on voyages of 10 or more days and two per cent for sheep. The voyage recorded a mortality rate for cattle of 2.75 per cent (165 cattle out of 6000 loaded) and for sheep of 3.89 per cent (1654 sheep out of 42 550 loaded).

4. Investigation Findings

The investigation found that the cause of the majority of mortalities was ruminal acidosis due to a sudden change in fodder. The change in fodder occurred when extra fodder was loaded while on route to Israel. The additional fodder was required due to a mechanical failure, which significantly increased the length of the voyage.

Due to importing country requirements the additional fodder was sourced from Israel and transferred at sea. The composition of the additional fodder was substantially different to that which had been fed on board.

4.1. The Exporter

Wellard has a long history of exports of cattle and sheep on voyages to Middle East markets. Between 17 January 2013 and 17 January 2014 Wellard exported 3225 cattle and 114 622 sheep to Israel and Jordan and recorded an overall mortality rate of 0.09 percent for cattle and 0.79 percent for sheep.

4.2. Preparation in the Registered Premises

The sheep exported to Israel were sourced from 49 properties in Western Australia and the sheep exported to Jordan were sourced from 140 properties in Western Australia. All the sheep entered one registered premises (La Bergerie) between 4 January 2014 and 12 January 2014. The animals were held in isolation for at least five clear days.

The sheep were inspected by an AAV on 16 and 17 January 2014 and 253 animals were rejected for eye problems, lameness, poor condition, scabby mouth or miscellaneous conditions such as wounds. A departmental veterinary officer (DVO) inspected the sheep at the registered premises on 16 January 2014.

The cattle were sourced from 173 properties in Western Australia and entered three separate registered premises (Twayta Pool, Lake Preston and Cullalla) between 31 December 2013 and 6 January 2014. The animals were held in isolation for at least 10 clear days. The cattle were inspected by an AAV on 16 January 2014 and nine animals were rejected due to lameness or injury. A DVO inspected the cattle on 17 January 2014.

There were no unusual health issues noted during isolation in any of the registered premises.

4.3. Loading of the vessel

Loading of the vessel was supervised by a DVO and occurred in accordance with heat stress risk assessment (HSRA) and ASEL requirements.

4.4. Conditions during the voyage

The department requires an Australian Government Accredited Veterinarian (AAV) to travel on board all voyages to the Middle East. The shipboard AAV is responsible for reporting to the department and works with the master of the vessel, stockmen and the crew to maintain the health and welfare of the livestock on board.

The AAV daily voyage reports noted rough seas on 16 and 17 February 2014 (day 29 and 30). There were no exceptional weather conditions noted for the remainder of the voyage. Daily records show that wet bulb temperatures on-deck did not exceed 28 degrees Celsius on any day. This is below the heat stress threshold for *Bos taurus* beef cattle (30 degrees wet bulb), *Bos indicus* cattle (32.5 degrees wet bulb) and merino sheep (30.6 degrees wet bulb)(Maunsell Australia Pty Ltd, 2003). Based on this information, and the information provided by the AAV about the cause of the mortalities, neither heat stress nor rough seas appear to have been a contributing factor to the mortalities.

The following chart shows the deck temperatures for each day of the voyage. The heat stress thresholds (HST) for *Bos indicus* and *Bos taurus* cattle and merino sheep are also included for comparison.

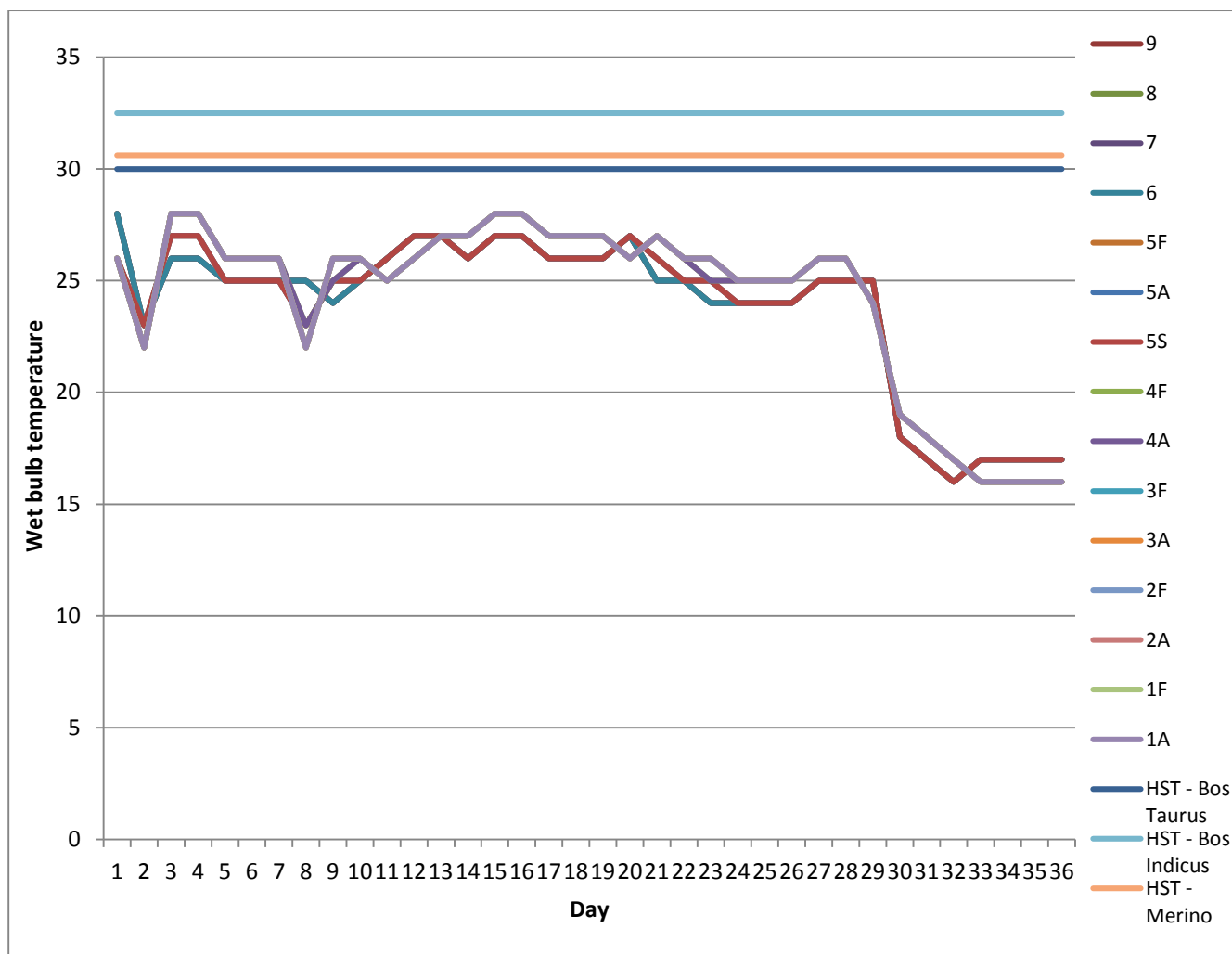


Figure 1: Wet bulb temperature by deck, and Heat Stress Threshold (HST) for Bos indicus and Bos Taurus cattle and Merino sheep

4.5. Mechanical issues

The vessel carrying the consignment experienced mechanical issues affecting the main engine on 24 January 2015 (day 6) of the voyage. The exporter advised the department of the issues on 29 January 2014 (day 11) of the voyage and also advised that the engine issues did not affect livestock services and that all livestock services remained in service.

Repairs to the engine were initially attempted by personnel on board. When it became apparent that extra parts were required, a technician from the engine manufacturer boarded the vessel for further assessment. The technician could not complete the repairs but confirmed the vessel was able to proceed at a reduced speed. The exporter advised the department on 3 February 2014 (day 16) that due to the slower rate of travel, the total voyage time would exceed initial estimates and that insufficient fodder was on board to last the remainder of the voyage.

4.6. Fodder and water arrangements throughout the voyage

The exporter initially advised the department that despite the engine issues, livestock services on the vessel had not been affected and fodder and water could be provided for the remainder of the voyage. There was no interruption to the supply of water to livestock throughout the voyage. On day 11 of the voyage, following repairs to the ship engine (which failed to return the engine to full capacity), Wellard considered the worst case scenario of sailing at a lower speed and extending the length of the voyage. This scenario identified that insufficient fodder remained on board to feed the

livestock up to the point of discharge and Wellard commenced searching for locations that could supply additional fodder.

The AAV and exporter reported that attempts to ration fodder were abandoned as a short trial in sheep led to competition and increased mortalities.

After consultation with the department, which also consulted the importing country authorities, and taking into account the importing countries requirements on the origin and type of fodder that could be sourced, the decision was made to load additional fodder (sourced from Israel) en route. The fodder was transferred from another vessel while at anchorage at Djibouti on 13 February 2014 (day 26 of the voyage).

The new fodder was loaded and mixed with the fodder remaining on board; however the exporter and AAV report that due to the method of mixing and the small amount of fodder remaining on board there was limited ability to transition the livestock from the existing to the new fodder. This has been identified as a contributing factor to the development of ruminal acidosis in both the cattle and sheep, and the resulting mortalities.

4.7. Mortalities and treatments during the voyage

A significant increase in mortalities was noted in the days following the transfer of additional fodder onto the vessel (day 26). On day 28 of the voyage, the mortality rate in sheep was 2.33 per cent, exceeding the reportable level of 2 per cent. On day 29 the mortality rate in cattle was 1.58 per cent, exceeding the reportable level of 1 per cent.

The AAV on board noted there was an increase in diarrhoea approximately 30 hours after the additional fodder was loaded and made available to livestock. The following morning an increased mortality rate was reported by the AAV. The AAV also performed necropsies, with findings indicating mortalities were caused by ruminal acidosis.

The daily and cumulative mortality figures are included in the following table and chart:

| Day | Cattle | | | Sheep | | |
|-----|-----------------------|----------------------------|------------------------|-----------------------|----------------------------|------------------------|
| | Daily Mortality Count | Cumulative Mortality Count | Cumulative Mortality % | Daily Mortality Count | Cumulative Mortality Count | Cumulative Mortality % |
| 1 | 0 | 0 | 0.00 | 0 | 0 | 0.00 |
| 2 | 0 | 0 | 0.00 | 30 | 30 | 0.07 |
| 3 | 0 | 0 | 0.00 | 11 | 41 | 0.10 |
| 4 | 0 | 0 | 0.00 | 9 | 50 | 0.12 |
| 5 | 0 | 0 | 0.00 | 21 | 71 | 0.17 |
| 6 | 0 | 0 | 0.00 | 16 | 87 | 0.20 |
| 7 | 0 | 0 | 0.00 | 21 | 108 | 0.25 |
| 8 | 0 | 0 | 0.00 | 28 | 136 | 0.32 |
| 9 | 0 | 0 | 0.00 | 23 | 159 | 0.37 |
| 10 | 0 | 0 | 0.00 | 28 | 187 | 0.44 |
| 11 | 0 | 0 | 0.00 | 30 | 217 | 0.51 |
| 12 | 0 | 0 | 0.00 | 32 | 249 | 0.59 |
| 13 | 2 | 2 | 0.03 | 28 | 277 | 0.65 |
| 14 | 0 | 2 | 0.03 | 33 | 310 | 0.73 |
| 15 | 1 | 3 | 0.05 | 38 | 348 | 0.82 |
| 16 | 2 | 5 | 0.08 | 20 | 368 | 0.86 |

| Day | Cattle | | | Sheep | | |
|-----|-----------------------|----------------------------|------------------------|-----------------------|----------------------------|------------------------|
| | Daily Mortality Count | Cumulative Mortality Count | Cumulative Mortality % | Daily Mortality Count | Cumulative Mortality Count | Cumulative Mortality % |
| 17 | 0 | 5 | 0.08 | 30 | 398 | 0.94 |
| 18 | 1 | 6 | 0.10 | 23 | 421 | 0.99 |
| 19 | 0 | 6 | 0.10 | 26 | 447 | 1.05 |
| 20 | 0 | 6 | 0.10 | 21 | 468 | 1.10 |
| 21 | 2 | 8 | 0.13 | 28 | 496 | 1.17 |
| 22 | 0 | 8 | 0.13 | 36 | 532 | 1.25 |
| 23 | 0 | 8 | 0.13 | 31 | 563 | 1.32 |
| 24 | 2 | 10 | 0.17 | 35 | 598 | 1.41 |
| 25 | 1 | 11 | 0.18 | 23 | 621 | 1.46 |
| 26 | 1 | 12 | 0.20 | 35 | 656 | 1.54 |
| 27 | 2 | 14 | 0.23 | 33 | 689 | 1.62 |
| 28 | 24 | 38 | 0.63 | 302 | 991 | 2.33 |
| 29 | 57 | 95 | 1.58 | 371 | 1362 | 3.20 |
| 30 | 34 | 129 | 2.15 | 87 | 1449 | 3.41 |
| 31 | 30 | 159 | 2.65 | 47 | 1496 | 3.52 |
| 32 | 6 | 165 | 2.75 | 18 | 1514 | 3.56 |
| 33 | 0 | 165 | 2.75 | 55 | 1569 | 3.69 |
| 34 | 0 | 165 | 2.75 | 85 | 1654 | 3.89 |
| 35 | 0 | 165 | 2.75 | 0 | 1654 | 3.89 |
| 36 | 0 | 165 | 2.75 | 0 | 1654 | 3.89 |

Table 1: Daily and cumulative mortality counts and cumulative mortality percentage, for cattle and sheep, by day

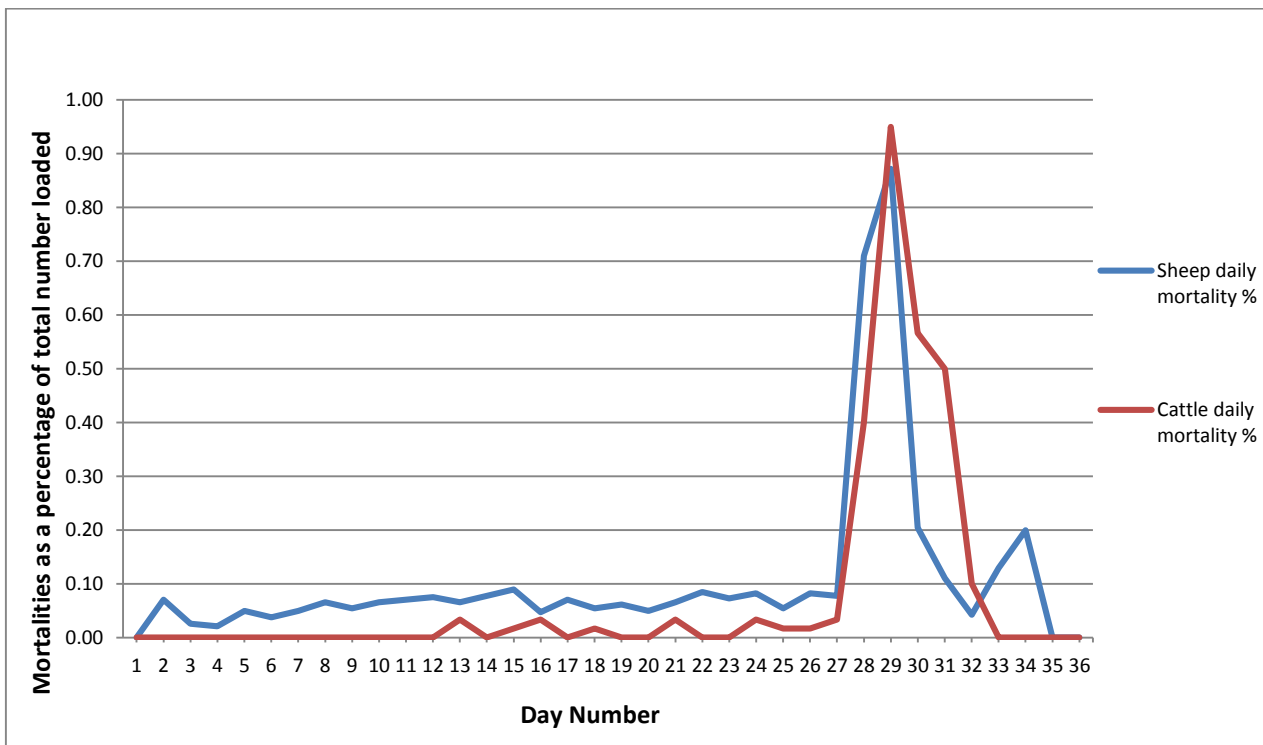


Figure 2: Daily mortality percentage for cattle and sheep

4.8. Mortality by class

The highest mortality rates were noted in A and B lamb (cross bred lambs) and horned ram classes. The AAV noted in a report to the department that first signs including diarrhoea were most noticeable in the more enthusiastic feeding class, cross bred lambs.

The mortality rates, by class, are detailed in the following table and chart.

| Species | Class | Total Loaded | Total Mortality | Mortality % |
|----------------|------------|--------------|-----------------|-------------|
| Sheep: | A Lambs | 6000 | 384 | 6.40 |
| | B Lambs | 6800 | 400 | 5.88 |
| | Horn Rams | 3001 | 167 | 5.56 |
| | Poll Rams | 2562 | 71 | 2.77 |
| | Young Rams | 1712 | 75 | 4.38 |
| | A Wethers | 5937 | 187 | 3.15 |
| | A Wethers | 7086 | 145 | 2.05 |
| | B Wethers | 8939 | 204 | 2.28 |
| | C Wethers | 513 | 21 | 4.09 |
| Cattle: | Steers | 1562 | 46 | 2.94 |
| | Heifers | 1411 | 39 | 2.76 |
| | Bulls | 3027 | 80 | 2.64 |

Table 2: Total mortality figures by class of livestock

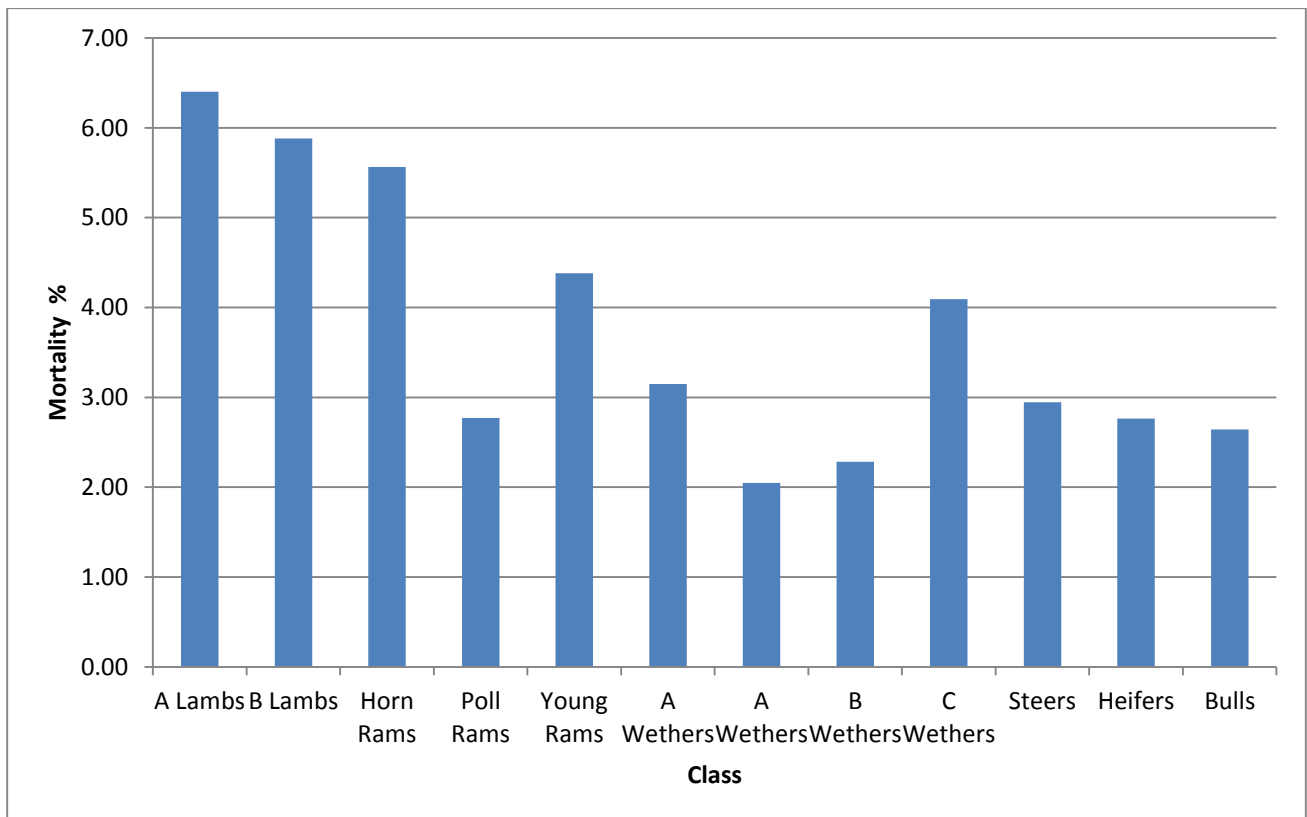


Figure 3: Total mortality percentage by class of livestock

4.9. Mortality by deck

The highest mortality rates were noted on Deck 5 (Fore) and Deck 9. These were the locations of the horn rams (Deck 5 – fore) and the A and B lambs (deck 9). While the cause of the increased mortality could be due to either the location or the class, information provided by the AAV noted that these classes were more aggressive in feeding, and it seems likely that the class (and associated feeding behaviour), rather than location, was the primary risk factor.

The mortality figures, by deck, are included in the following table and chart.

| Deck: | Sheep | | | Cattle | | |
|-------|--------------|-----------------|----------------|--------------|-----------------|----------------|
| | Total loaded | Total mortality | Mortality rate | Total loaded | Total mortality | Mortality rate |
| 9 | 12800 | 784 | 6.13 | 0 | 0 | 0 |
| 8 | 11591 | 291 | 2.51 | 0 | 0 | 0 |
| 7 | 0 | 0 | 0.00 | 3194 | 86 | 2.69 |
| 6 | 0 | 0 | 0.00 | 2806 | 79 | 2.82 |
| 5F | 2125 | 54 | 2.54 | 0 | 0 | 0 |
| 5A | 1511 | 115 | 7.61 | 0 | 0 | 0 |
| 4F | 1677 | 65 | 3.88 | 0 | 0 | 0 |
| 4A | 2360 | 101 | 4.28 | 0 | 0 | 0 |
| 3F | 1962 | 78 | 3.98 | 0 | 0 | 0 |
| 3A | 1438 | 45 | 3.13 | 0 | 0 | 0 |
| 2F | 1847 | 29 | 1.57 | 0 | 0 | 0 |
| 2A | 2277 | 49 | 2.15 | 0 | 0 | 0 |
| 1F | 1394 | 27 | 1.94 | 0 | 0 | 0 |
| 1A | 1568 | 16 | 1.02 | 0 | 0 | 0 |

Table 3: Mortality by species and deck

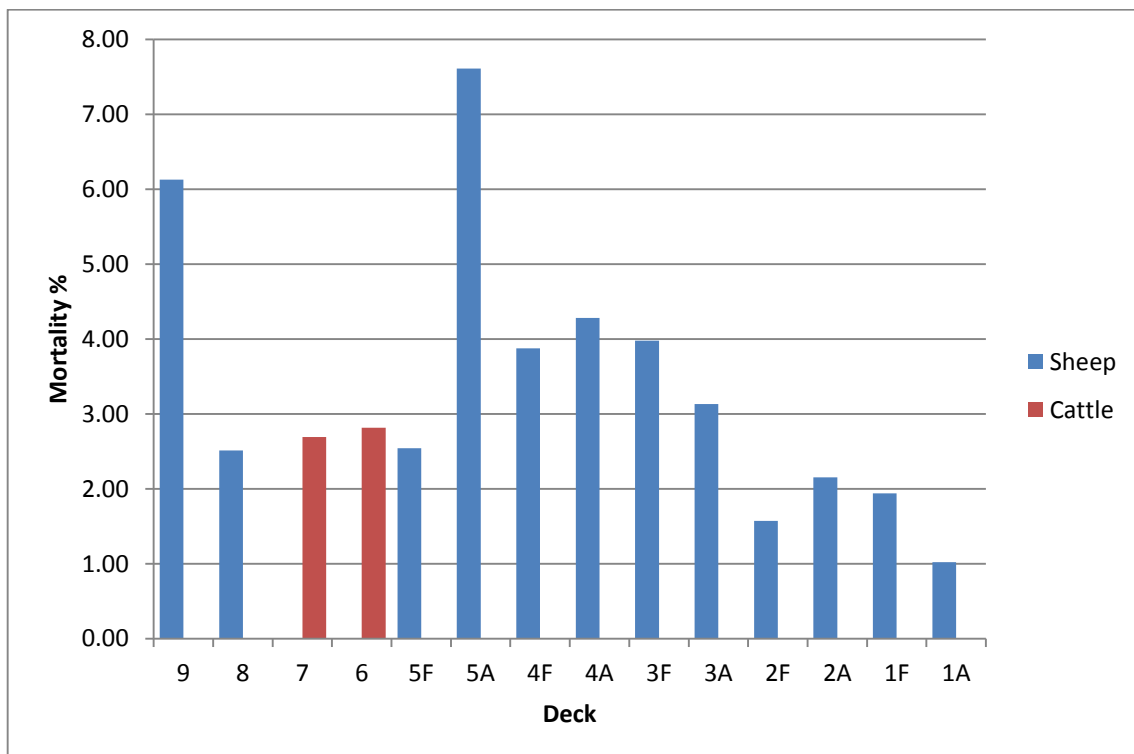


Figure 4: Mortality percentage by species and deck

5. Australian Maritime Safety Authority (AMSA) evaluation of the vessel

The Australian Maritime Safety Authority (AMSA) investigates vessels when the mortality of any one species is equal to or greater than the reportable level defined in ASEL. The AMSA investigation reported there was a mechanical failure of the ship's propulsion engine which delayed the vessel at sea. The voyage continued at a speed of 12 knots as opposed to the normal 18 knots. The AMSA investigation concluded there were no deficiencies in the provision of livestock services, including pens, ventilation, lighting, fodder and water supply systems as required by Marine Order 43.

6. Conclusion

Two factors led to the mortalities on this voyage. The ship experienced mechanical issues causing a significant reduction in speed and extending the voyage length from an estimated 17 day voyage to 36 days. Subsequent to this the need to obtain additional fodder, importing country requirements in respect to the type and origin of feed that could be sourced, delays in sourcing additional fodder that met importing country requirements, and the sudden change in fodder composition led to ruminal acidosis. This accounted for the sharp increase in the daily rate of mortalities of both cattle and sheep.

7. Action Taken

The vessel's next voyage was to a different market on a voyage of less than 10 days. Prior to permission to load livestock the vessel was inspected by AMSA to ensure that it was mechanically sound. No extra conditions were applied to this consignment in relation to the previous mortality incident. The mortality rate for this voyage was 0.06 per cent (8 cattle out of 13 056 loaded).

The vessel's next voyage longer than 10 days occurred in June 2014 and included both cattle and sheep. The department required the exporter to load an additional seven days of fodder (four days in addition to ASEL requirements). The mortality rate for this voyage was reported as 1.49 per cent for sheep (751 out of 50 273 loaded) and 0.37 per cent for cattle (17 out of 4 543 loaded).

From the time of this incident to 1 November 2015 the vessel has completed 12 live export voyages to markets in South-East Asia and the Middle East. There have been no further reportable mortality events on this vessel.

Following this incident the exporter has taken the following actions to avoid a similar incident in the future, including:

- adding reference to this incident to the Wellard operations and governance manual
- developing procedures to match the composition of fodder on board with any fodder loaded onto the vessel en route.

Obtaining details of the composition of the fodder on board and matching any fodder obtained en route will reduce the likelihood of recurrence of this event. Time constraints and importing country requirements may limit exporters' ability to source additional fodder. However, a more appropriate choice of additional fodder and transitioning onto new fodder is necessary to address any similar issues in the future.

The department has issued an Export Advisory Notice (2015-12) to remind exporters of the requirement to have adequate contingency plans to address food shortages during voyages.

8. References

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

Reference Advisory Group of Fermentative Acidosis of Ruminants (RAGFAR), 2007, *Ruminal Acidosis – understandings, prevention and treatment: A review for veterinarians and nutritional professionals*. Australian Veterinary Association, Sydney. Available at www.ava.com.au/sites/default/files/documents/Other/RAGFAR_doc.pdf