



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

Mortality Investigation Report 59

Sheep and Goats exported by air to Malaysia in August 2015

December 2016



Summary

On 8 August 2015, two consignments of sheep and goats were exported by Lembiru Livestock Pty Ltd (Lembiru) by air from Sydney to two separate destinations. There were 670 slaughter sheep and 1000 slaughter goats consigned to Kuala Lumpur, Malaysia and 833 breeding goats consigned to Kota Kinabalu, East Malaysia. During the flight between Kota Kinabalu and Kuala Lumpur, 125 mortalities were recorded from the 670 slaughter sheep loaded (18.66 per cent mortality) and 48 mortalities were recorded from the 1000 slaughter goats loaded (4.8 per cent mortality). This exceeds the reportable mortality level of two per cent for both species as prescribed by the *Australian Standards for the Export of Livestock (Version 2.3) April 2011* (ASEL).

The investigation found that a period of inadequate ventilation is the most likely cause of the mortalities. During transit at Kota Kinabalu, there was failure in starting the auxillary power unit to run the ventilation system, delay in starting the backup ventilation and an extended period on the ground.

Introduction

On 8 August 2015, two consignments of sheep and goats were exported by Lembiru by air from Sydney to two separate destinations. There were 670 slaughter sheep and 1000 slaughter goats consigned to Kuala Lumpur, Malaysia and 833 breeding goats consigned to Kota Kinabalu, East Malaysia. During this flight, 125 mortalities were recorded from the 670 slaughter sheep loaded (18.66 per cent mortality) and 48 mortalities were recorded from the 1000 slaughter goats loaded (4.8 per cent mortality). This exceeds the reportable mortality level of two percent for both sheep and goats as prescribed by ASEL.

The department requested information about this consignment from the exporter and the airline to investigate the cause of mortalities and to determine if any action is required to reduce the likelihood of a recurrence.

Lembiru is experienced in the export of livestock by air with no previous reportable mortality events. In the 12 months before this consignment Lembiru exported 21,883 slaughter/breeder goats to Malaysia and 7,633 slaughter/breeder sheep to Malaysia with 9 mortalities reported.

Investigation findings

Pre-export preparation

Slaughter sheep (Malaysia)

The majority of sheep for this consignment were merino rams and wethers sourced from saleyards in Cootamundra and Wagga Wagga and from a farm near Bathurst. These sheep arrived at the approved premises near Forbes, NSW between 30 July 2015 and 5 August 2015. Twenty seven sheep in this consignment had been held at the approved premises since April 2015. There were no mortalities or health issues reported.

An Australian Government Accredited Veterinarian (AAV) inspected the slaughter sheep at the approved premise on 7 August 2015, two sheep were rejected at this inspection due to lameness or bad eyes.

Slaughter goats (Malaysia)

Of the 1000 slaughter goats, 97 were prepared at an approved premises near Nurmurkah, Victoria. These animals had been at the approved premises since April 2015. The remainder (903) of the slaughter goats were held at the approved premises near Forbes, NSW along with the slaughter sheep. The majority of these goats came from a single property near Dunkfeld in Queensland. These animals were trucked from Queensland and arrived at the approved premises on 4 August 2015.

There were no mortalities or health issues reported at the approved premises. An AAV inspected the slaughter goats at the approved premises on 7 August 2015, six goats were rejected at this inspection due to lameness of ill health.

Breeder goats (Sabah)

The breeding goats consisted of male and female Boer, Boer cross and Saanen cross goats. These animals were sourced from 27 properties in New South Wales, Victoria, South Australia and Queensland and were held at the approved premises near Nurmurkah, Victoria. All animals had been at the approved premises for at least a month before export with the majority of animals arriving at the approved premises in May and June. There were no health concerns or mortalities during pre-export preparation.

An AAV and department veterinary officer inspected the breeder and slaughter goats at the approved premises near Nurmurkah, Victoria on the 7 August 2015. Seven animals were rejected from the consignment due to ill health, bad eyes or lameness. The remainder of the goats were reported in good health.

Loading onto the aircraft

The sheep and goats were transported from the approved premises in Forbes, to Sydney International Airport by truck. Slaughter animals were drafted and loaded in separate lines: slaughter goats were separated into weight categories, small and medium; slaughter sheep were separated into wethers, horned rams and non-horned rams.

The slaughter sheep and goats were loaded into 20 triple tier crates which were loaded onto the main deck of the aircraft. Breeder goats were loaded into seven double tier crates and loaded onto the main deck and seven single tier crates loaded into the forward and rear belly holds. The average live weight for the sheep was 41.81kg and the average live weight for the slaughter goats was 29.26kg. The stocking density in all pallets was in compliance with ASEL.

After loading was completed the captain signed the Captain's Instructions. The Captain's Instructions advised that livestock were being carried and notified the temperature requirements. The flight departed at approximately 11:52 am.

Crates

The crate manufacturer provided a statement to the exporter confirming the crates met the recommendations of the Best practice design of crates by air ²(Hogan and Willis, 2009). These recommendations were based on research completed by Meat and Livestock Australia and Livecorp.

Load plan

The load plan for the main deck for this consignment is shown at Attachment 1.

There were 20 triple tier crates and seven double tier crates in the main deck and seven single tier crates on the lower deck.

The breeder goats consigned to Kota Kinabalu were loaded in single tier crates on the lower deck and double tier crates on the main deck. The slaughter sheep and goats for Malaysia were loaded in the triple tier crates on the main deck. This load plan was configured to facilitate easy unloading in Kota Kinabalu. The load plan was prepared in advance in consultation with the airline.

In Flight

The aircraft departed Sydney at 11:52 am on August 8 2015 and arrived at Kota Kinabalu at 7:19 pm. The Captain was instructed that cargo hold ventilation system was to be set at 16-18°C while the

livestock were on board. The airline has reported that the on board ventilation was fully functional and the temperatures within the instructed 16-18°C during this leg of the flight.

Upon arrival at Kota Kinabalu the airline reported that livestock were in good health and there were no reported welfare or mortality issues. The single tier crates in the belly hold were immediately discharged after arrival.

During transit in Kota Kinabalu the auxillary power unit (APU) required to run the ventilation system while the aircraft engines were shutdown could not be started. Multiple attempts were made to start the APU and it was started approximately two hours after landing. During this period the belly hold, aircraft nose and rear doors were opened and the ground air conditioning trolley was hooked up to the aircraft and engaged. During the period between shutting down the aircraft engines and engagement of the back-up ventilation system there was no artificial ventilation available. The temperature at Kota Kinabalu at 8 pm was 31 degrees and 75 per cent humidity¹.

The airline reports that the back-up ventilation system was fully engaged and working within 35 minutes of engine shutdown. As the single tier crates in the belly hold were immediately discharged after arrival the ventilation generated by the ground air-conditioning trolley was directed to the main deck.

While in transit at Kota Kinabalu the load master had concerns about the ability to safely trim (balance the cargo for safe flight) the aircraft after unloading the breeder goats at Kota Kinabalu. This issue took approximately five hours to be resolved. During this period the seven double tier crates of breeder goats loaded on the main deck remained on board the aircraft.

The expected transit time at Kota Kinabalu was one hour, but due to the aircraft trimming issue the aircraft spent five hours and 22 minutes on the tarmac at Kota Kinabalu.

After resolving the trimming issue the aircraft departed Kota Kinabalu at 12.41 am on 9 August 2015. During the Kota Kinabalu to Kuala Lumpur leg, ventilation and temperature settings were maintained as per the Captain's instructions and the ventilation systems were reported to be fully functional. The aircraft arrived at Kuala Lumpur at 2:48 am on August 9 2015.

Mortalities

On arrival in Kuala Lumpur 125 sheep and 48 goats were found dead in the crates. No moribund livestock were found with all mortalities occurring prior to arrival in Kuala Lumpur. All surviving livestock were found to be in satisfactory health except for dehydration.

Post mortems were completed by a Malaysian veterinarian who was also a Director of the importing company. The post mortem report states the cause of death was due to pulmonary failure with lung tissue found to be seriously congested. The report also states that upon arrival the mortalities had absence of body heat and had developed rigor mortis indicating death had occurred a number of hours before.

Cause of Mortalities

From the information available the most likely cause of the mortalities was inadequate ventilation on the main decks during transit at Kota Kinabalu causing increased temperature, humidity, carbon dioxide and ammonia levels resulting in asphyxiation. The department is unable to determine the time the mortalities occurred. Lembiru had a veterinary representative on site at Kota Kinabalu, however, due to aircraft safety regulations they were denied access to the aircraft during transit. The airline reported that there were no health problems and no mortalities observed during transit. However, given the degree of rigor mortis reported on arrival in Kuala Lumpur it is considered possible that mortalities occurred while in transit in Kota Kinabalu.

Conclusions

Inadequate ventilation is the most likely cause of the mortalities. The high mortalities in the upper decks of the crates is consistent with inadequate ventilation causing increased temperature, humidity, carbon dioxide and ammonia levels. The delay in starting the APU and extended period in transit in Kota Kinabalu is the most likely cause of inadequate ventilation.

Actions

In response to this incident the exporter has reinstated their policy of having grooms accompany all full freighter consignments that require transit stops. They have also added additional stipulations to the Captain's Instructions advising that the APU must be started on taxi after landing. In addition, Lembiru have indicated they will not ship livestock on routes that require transit stops that do not provide back up ground ventilation systems or that they are not confident can supply sufficient airflow to livestock in the event of an APU failure.

Lembiru has also shared full details of this incident with industry stakeholders to assist with current research on aircraft ventilation for livestock transport.

The department considers the exporters response to this incident is satisfactory and has not applied any additional conditions in response to this mortality event.

Risks associated with failure of the APU during transit stops must be considered and addressed in exporter's air risk management plan for export of livestock by air.

References

1. <http://www.worldweatheronline.com/kota-kinabalu-weather-history/sabah/my.aspx> accessed 21 March 2016
2. Hogan, L and Willis, G 2009, *Best practice design of crates for livestock by air*. Report by E.A. Systems Pty Ltd for project W.LIV.0261, Meat and Livestock Australia, Canberra (www.mla.com.au/Research-and-development/Final-report-details?projectid=14974)

Attachment 1 - Loading Plan & Mortalities

Main Deck

A1	A2	B1	CR	DR	ER	FR	GR	HR	JR	KR	LR	MR	PR	RR	SR
					21/2 (3)	23/8 (3)	18/13 (3)	19/17 (3)	20/15 (3)	32/3 (3)	32/4 (3)	28/3 (3)		32/3 (3)	16/5 (3)
					27/2 (2)	26/2 (2)	28/2 (2)	27/16 (2)		31/1 (2)	30/1 (2)	15/2 (2)			
					27/1 (1)			26/3 (1)							
			CL	DL	EL	FL	GL	HL	JL	KL	LL	ML	PL	RL	SL
					21/4 (3)	19/3 (3)	19/14 (3)	18/13 (3)	32/3 (3)	35/3 (3)	25/3 (3)	32/7 (3)		31/3 (3)	29/4 (3)
					27/2 (2)		29/1 (2)	20/2 (2)		38/1 (2)	30/1 (2)	30/4 (2)		33/1 (2)	31/1 (2)



Lower Deck

11P	12P	21P	22P	23P	31P	32P	41P	42P	44	L
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No colour = vacant space

Blue = Double tiered crate

Orange = Triple tiered crate

Green = Single tiered crate

Details of each box:

- Crate location at top of box e.g. FR
- Total live animals loaded in deck of crate listed below crate location e.g. 21
- Number of mortalities listed next to animals loaded in bold e.g. /2
- Bracketed number is the tier number where the mortalities occurred e.g.
(1)=first (bottom) tier (2)=second (middle) tier (3)=third (top) tier