



Australian Government

Australian Transport Safety Bureau



ATSB TRANSPORT SAFETY REPORT
Aviation Occurrence Investigation
AO-2009-034
Final

Aircraft loading event
Sydney Airport, NSW
4 July 2009
VH-EBB
Airbus A330-202



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Abstract

On 4 July 2009, an Airbus A330-202, registered VH-EBB, was being operated on a scheduled passenger/freight flight from Sydney, New South Wales to Denpasar, Indonesia via Melbourne, Victoria. During loading of the aircraft at Sydney International Airport, a unit load device (ULD) was loaded onto the aircraft without the proper authorisation. Prior to the aircraft taxiing for departure, loading personnel realised that the ULD had been mistakenly loaded. However, there was confusion in the communication of that information to the flight crew and they operated the flight to Melbourne without knowledge of the mis-loading.

The investigation found that the pilot in command rejected the loading of the ULD before it was loaded in the forward cargo hold, but the status of that ULD was not clearly communicated to the ground handling team and it was returned to the outgoing freight holding area of the departure bay. Contrary to the aircraft operator's procedures, the ULD was subsequently loaded into the aircraft's aft cargo hold, in the absence of a leading hand and without reference on the loading instruction report or the authorisation of the pilot in command. Contributing to the occurrence was a lack of procedure or guidance for the segregation of freight that had been rejected during loading.

The investigation identified a number of factors that did not contribute to the incident, but increased operational risk. Those factors related to the performance of the leading hand role, load-checking and procedures for communicating with flight crew after pushback.

The aircraft operator initiated proactive safety action to improve the training and supervision of loading staff, including guidelines for all staff involved with the training and support of new ports or ground handling agents. The operator also implemented procedures to enable ground handling agents to make emergency contact with the aircraft crew after pushback and incorporated those procedures in the relevant manuals.

THE AUSTRALIAN TRANSPORT SAFETY BUREAU

The Australian Transport Safety Bureau (ATSB) is an independent Commonwealth Government statutory agency. The Bureau is governed by a Commission and is entirely separate from transport regulators, policy makers and service providers. The ATSB's function is to improve safety and public confidence in the aviation, marine and rail modes of transport through excellence in: independent investigation of transport accidents and other safety occurrences; safety data recording, analysis and research; fostering safety awareness, knowledge and action.

The ATSB is responsible for investigating accidents and other transport safety matters involving civil aviation, marine and rail operations in Australia that fall within Commonwealth jurisdiction, as well as participating in overseas investigations involving Australian registered aircraft and ships. A primary concern is the safety of commercial transport, with particular regard to fare-paying passenger operations.

The ATSB performs its functions in accordance with the provisions of the *Transport Safety Investigation Act 2003* and Regulations and, where applicable, relevant international agreements.

Purpose of safety investigations

The object of a safety investigation is to identify and reduce safety-related risk. ATSB investigations determine and communicate the safety factors related to the transport safety matter being investigated. The terms the ATSB uses to refer to key safety and risk concepts are set out in the next section: Terminology Used in this Report.

It is not a function of the ATSB to apportion blame or determine liability. At the same time, an investigation report must include factual material of sufficient weight to support the analysis and findings. At all times the ATSB endeavours to balance the use of material that could imply adverse comment with the need to properly explain what happened, and why, in a fair and unbiased manner.

Developing safety action

Central to the ATSB's investigation of transport safety matters is the early identification of safety issues in the transport environment. The ATSB prefers to encourage the relevant organisation(s) to initiate proactive safety action that addresses safety issues. Nevertheless, the ATSB may use its power to make a formal safety recommendation either during or at the end of an investigation, depending on the level of risk associated with a safety issue and the extent of corrective action undertaken by the relevant organisation.

When safety recommendations are issued, they focus on clearly describing the safety issue of concern, rather than providing instructions or opinions on a preferred method of corrective action. As with equivalent overseas organisations, the ATSB has no power to enforce the implementation of its recommendations. It is a matter for the body to which an ATSB recommendation is directed to assess the costs and benefits of any particular means of addressing a safety issue.

When the ATSB issues a safety recommendation to a person, organisation or agency, they must provide a written response within 90 days. That response must indicate whether they accept the recommendation, any reasons for not accepting part or all of the recommendation, and details of any proposed safety action to give effect to the recommendation.

The ATSB can also issue safety advisory notices suggesting that an organisation or an industry sector consider a safety issue and take action where it believes it appropriate. There is no requirement for a formal response to an advisory notice, although the ATSB will publish any response it receives.

TERMINOLOGY USED IN THIS REPORT

Occurrence: accident or incident.

Safety factor: an event or condition that increases safety risk. In other words, it is something that, if it occurred in the future, would increase the likelihood of an occurrence, and/or the severity of the adverse consequences associated with an occurrence. Safety factors include the occurrence events (e.g. engine failure, signal passed at danger, grounding), individual actions (e.g. errors and violations), local conditions, current risk controls and organisational influences.

Contributing safety factor: a safety factor that, had it not occurred or existed at the time of an occurrence, then either: (a) the occurrence would probably not have occurred; or (b) the adverse consequences associated with the occurrence would probably not have occurred or have been as serious, or (c) another contributing safety factor would probably not have occurred or existed.

Other safety factor: a safety factor identified during an occurrence investigation which did not meet the definition of contributing safety factor but was still considered to be important to communicate in an investigation report in the interests of improved transport safety.

Other key finding: any finding, other than that associated with safety factors, considered important to include in an investigation report. Such findings may resolve ambiguity or controversy, describe possible scenarios or safety factors when firm safety factor findings were not able to be made, or note events or conditions which ‘saved the day’ or played an important role in reducing the risk associated with an occurrence.

Safety issue: a safety factor that (a) can reasonably be regarded as having the potential to adversely affect the safety of future operations, and (b) is a characteristic of an organisation or a system, rather than a characteristic of a specific individual, or characteristic of an operational environment at a specific point in time.

Risk level: The ATSB’s assessment of the risk level associated with a safety issue is noted in the Findings section of the investigation report. It reflects the risk level as it existed at the time of the occurrence. That risk level may subsequently have been reduced as a result of safety actions taken by individuals or organisations during the course of an investigation.

Safety issues are broadly classified in terms of their level of risk as follows:

- **Critical** safety issue: associated with an intolerable level of risk and generally leading to the immediate issue of a safety recommendation unless corrective safety action has already been taken.
- **Significant** safety issue: associated with a risk level regarded as acceptable only if it is kept as low as reasonably practicable. The ATSB may issue a safety recommendation or a safety advisory notice if it assesses that further safety action may be practicable.
- **Minor** safety issue: associated with a broadly acceptable level of risk, although the ATSB may sometimes issue a safety advisory notice.

Safety action: the steps taken or proposed to be taken by a person, organisation or agency in response to a safety issue.

FACTUAL INFORMATION

Sequence of events

Aircraft loading

On 4 July 2009, an Airbus A330-202 (A330), registered VH-EBB, was being operated on a scheduled passenger/freight flight from Sydney, New South Wales to Denpasar, Indonesia via Melbourne, Victoria. The flight was due to depart from Bay 5 of the international terminal at Sydney Airport at 1515 Eastern Standard Time¹.

The ground handling for the operator's A330 aircraft at Sydney was contracted to a company that specialised in airline ground handling. The company was new to the ground handling of the A330 aircraft type and, at the time of the occurrence, had been fulfilling the contract for 10 days. During that time, the ramp² operations for each aircraft turnaround had been monitored by experienced ground handling personnel representing the interests of the aircraft operator.

About 2 hours before the planned departure time, the leading hand who was assigned to the loading of the aircraft and another ground handler collected the freight for the flight from the apron area in front of the freight operator's terminal. The leading hand reported that the freight included a number of collocated unit load devices (ULDs), and that they checked the consignment details (including flight number) on each ULD. The freight was then towed to the departure bay and parked in the staging area in readiness for loading.

The departure bay was changed at relatively short notice and the aircraft was then towed to Bay 32, arriving at about 1425.

Ground handling personnel began loading the freight to the aircraft's forward cargo hold by progressively transferring the ULDs onto the loader (Figure 1 shows a typical loading process). The loader operator, assisted by one of the ground handling company ramp trainers, used the loader to elevate each ULD to hold height and transfer it into the hold. Further movement to the specific position in the hold as depicted on the load instruction report (LIR)³ was achieved using the aircraft's in-hold conveyer system.

The LIR assigned a specific location to each container or pallet in order to maintain the calculated weight and balance of the aircraft. It was the responsibility of the leading hand to ensure that each item of freight was loaded in the correct position and that each was properly secured. Due to a relatively complex load, and loader operator inexperience, the aircraft operator's representative was assisting in the positioning and securing of the freight in the forward cargo hold.

¹ The 24-hour clock is used in this report to describe the local time of day, Eastern Standard Time (EST), as particular events occurred. Eastern Standard Time was Coordinated Universal Time + 8 hours.

² The main aircraft parking area at an airport and, in the airline industry, associated with the ground handling activities that take place on the tarmac.

³ See the section titled *Team roles and responsibilities*. A copy of the actual LIR is at Appendix A.

Towards the end of loading the forward hold, ULD serial number AKE 23532 was presented to the pallet loader. The routine inspection of the ULD's details revealed that it did not appear on the LIR. After consulting with the aircraft operator's representative, the ramp supervisor went to the flight deck to obtain the pilot in command's (PIC) approval to load the ULD in the 'No-Fit'⁴ location at the front of the forward hold.

Figure 1: Typical AKE-type ULD loading into an A330 forward hold



Image digitally altered to remove operator logos.

By that stage of the pre-flight preparations, and in accordance with the operator's standard procedure, the PIC had assumed responsibility for load control, including the acceptance or rejection of freight. After contacting the load planner and consulting with the ramp supervisor, the PIC decided to reject the container. That decision was based primarily on a lack of paperwork and information about its contents.

The ramp supervisor stated that on leaving the flight deck, he transmitted a message to the leading hand that 'AKE 23532 is not to be loaded, repeat, not to be loaded.'⁵ The leading hand reported that he heard and acknowledged the instruction. The loader operator and ramp trainer reported that they were advised by someone that the ULD was not going into the forward hold, so they closed the hold and repositioned the pallet loader at the aft cargo hold to continue underfloor loading. The freight tug driver returned the rejected ULD to the bay staging area.

⁴ A specific space in an aircraft cargo hold designated as unoccupied.

⁵ Ground radio communications were not recorded. The aircraft operator later reported that its own investigation understood that the ramp supervisor's transmission stated that AKE 23532 was 'not to be loaded in the forward hold.'

Loading of the freight continued under the supervision of the ramp supervisor while the assigned leading hand left the bay on his own initiative to assist transporting the baggage containers from the terminal collection point to the aircraft. There was no handover process in regard to the leading hand role and the leading hand considered that the ramp supervisor had now assumed that role.

As the last item listed on the LIR was loaded, the ramp supervisor left the aft cargo hold area for the flight deck to provide the confirmed LIR details to the PIC. The ramp supervisor recalled being pressed for time, and that he left for the flight deck before loading was complete to allow the aircraft to depart as quickly as possible. Loading was complete at about 1525.

The ramp trainer reported that, after loading the last item, he shouted and gestured to the operator's representative to ascertain if the remaining ULD (AKE 23532) in the bay staging area was going to be loaded in one of the two No-Fit positions in the aft hold. In the absence of the ramp supervisor and the nominated leading hand, the ramp trainer considered that the operator's representative, who had been assisting with various aspects of the loading, would have been aware of what was going on.

One of the tug drivers picked up AKE 23532 and delivered it to the pallet loader at the aft cargo door where the assembled ground handling personnel, including the operator's representative, pushed it onto the loader. Thinking that the operator's representative had authorised the loading, the loader operator, assisted by the ramp trainer, loaded the ULD and closed the hold door.

Concurrently, on the flight deck, the ramp supervisor handed over the finalised LIR to the flight crew, who entered the data into a laptop computer to verify the aircraft's weight and balance. The ramp supervisor retained a copy of the LIR and vacated the aircraft, remaining near the main cabin aircraft door to assist in the dispatch of the aircraft.

The aircraft was pushed back onto the adjacent taxiway under the supervision of the operator's representative and the pushback tug returned to Bay 32.

While returning to the bay, the ramp supervisor met up with the operator's representative who asked to see the copy of the LIR. On seeing the two No-Fits depicted in the aft cargo hold, the representative advised that the leftover ULD had been loaded in one of those positions.

The operator's representative attempted to call the flight crew on the aircraft tug radio, making contact with someone who he thought was the PIC. That contact was actually with a customer service person located at the operator's check-in counters. The customer service employee thought the person calling on the radio was the PIC.

The operator's representative advised that a 750 kg cargo container had been inadvertently loaded on the aircraft at position 43L and asked if they would like to return to the gate and offload the container or continue. The customer service person confirmed the details and in response to the question, advised that he wasn't sure and would get back to him.

On the advice of his supervisor, the customer service person called the operator's joint operations centre (JOC) and advised of the situation. The JOC advised that it was up to the PIC and that they could not get in contact with the aircraft. When the customer service person contacted the ramp supervisor to ensure that he was aware of the situation, the ramp supervisor said that he was and contact had been made with the PIC. Subsequently, the JOC contacted the customer service person and

advised that 'the ramp' had been in contact with the aircraft and would advise further.

The aircraft departed at 1539, without knowing that ULD AKE 23532 was on board the aircraft. On arrival at Melbourne, the PIC became aware that the ULD had been loaded when he was contacted by the load planner to ensure that it was not on-carried to Denpasar. The ULD was unloaded at Melbourne.

The flight crew reported that the aircraft handled normally and that the aircraft remained within the calculated weight and balance limits throughout the Sydney to Melbourne flight.

Unit load device AKE 23532

On 3 July 2009, AKE 23532 was loaded onto a flight from Shanghai, China, to Sydney. The flight was due to arrive in Sydney at 0830 on 4 July 2009 and the freight was initially booked for same-day onward transport to Melbourne. The initial deadload weight statement⁶ for the flight to Melbourne that was issued by the freight operator at 1727 on 3 July included AKE 23532.

At 0832 on 4 July 2009, the onward booking for the ULD was recorded as changed by the freight operator to a different flight. However, the 'tarmac advice' provided to the personnel unloading the flight from Shanghai was generated earlier and specified that AKE 23532 was to be transhipped to the original flight. That document did not change. The flight carrying the ULD arrived in Sydney at 1057 and the 'tarmac report' that was generated by the unloading team showed that the ULD was unloaded by 1150 and was being transhipped to the flight to Melbourne.

The exact movement details of the ULD after arrival at the freight terminal were not established. However, the normal process was for the unloading team to affix a green sticker to inbound freight with the destination or tranship requirements extracted from the tarmac report. Freight was then transferred to the appropriate area.

Freight intended for carriage on a specific flight was assembled together on the tarmac by the export freight personnel using the final deadload weight statement. The final deadload weight statement for the flight to Melbourne was issued by the freight operator at 1118 and did not include ULD AKE 23532. The freight operator was not able to determine how the ULD was assembled with the other freight for the flight, given that it did not appear on the final deadweight load statement.

Personnel information

Ramp supervisor

The ramp supervisor had worked for the handling company for about 1 year in narrow-body aircraft loading and had recently opted to transfer to the new contract, which involved wide-body operations. Prior to the contract starting, the supervisor completed classroom training that was conducted by the in-house trainers, including

⁶ Document produced by the freight operator that listed the details of freight booked on a specific flight.

for the role as leading hand. At the time of the incident, the ramp supervisor had not completed the practical training required for the leading hand role. On the day of the incident, the ramp supervisor had supervised the ground handling of an earlier flight and then had a break before dealing with the occurrence flight. The ramp supervisor reported that he was fit and was feeling fine on the day.

Leading hand

The leading hand was recruited by the handling organisation for the new contract. He had no specific previous experience in aircraft freight loading, but had delivered catering to aircraft on the tarmac. Prior to the contract starting, the leading hand completed in-house training. Once the contract began, he completed practical training with the in-house trainers. It was reported that, at the time of the incident, the leading hand was qualified for that role. On the day of the incident, the leading hand began his shift at 1300 and had had about 8 hours sleep the previous night. He reported being well and fit.

Loader operator

The loader operator was recruited by the handling organisation for the new contract. He had about 1 year of prior experience in baggage handling for a major airline. After in-house training, he had recently qualified for operating the pallet loader. On the day of the incident, he was being supervised by a handling company trainer and was assisted by the operator's representative. The loader operator had been working for 12 consecutive days, but did not recall any problems with his health or wellbeing.

Ramp trainer

The ramp trainer was one of five handling company employees that were certified as trainers by the aircraft operator. He had been transferred from a ramp training role at one of the handling company's existing operations to assist with the new contract. The trainer reported that he had been sleeping for 8 hours a night but, due to a limited number of trainers, he had been working long days every day since the contract started and was exhausted.

Operator's representative

The operator's representative conducted the trainer certification program for the handling company trainers and, along with other experienced ground handling personnel, was overseeing the initial part of the contract operations. He reported that he had worked about 100 hours in the week before the occurrence and was just starting to rotate with colleagues to have an afternoon off.⁷

⁷ A review by the operator of their records found that, in the 7 days leading up to the incident, the representative was rostered to work about 45 hours. Of those days, 29 and 30 June were rostered for the representative as being non-working days.

Aircraft information

The A330 is a wide-body aircraft with underfloor cargo hold areas used for the carriage of baggage and freight. As is typical of wide-body aircraft, all of the freight in the main cargo holds was containerised. That required specialised loading equipment with operators trained in the use of the equipment and in-hold methods of positioning and securing freight (Figure 2). The loading of wide-body aircraft was generally considered to be a more complex operation than the loading of smaller, narrow-body aircraft in which freight was predominantly handled manually.

Figure 2: Typical A330 aft cargo hold (looking aft)



Organisational and management information

Reference material

The primary reference for ground handling operations involving the aircraft was the aircraft operator's *Operations Manual Vol 15 – Airport Policy and Procedures* (OM-15). That document specified the responsibilities of key airport operations personnel including contractors and described the various ground handling processes applicable to the Airbus A320 (A320) and A330 aircraft. Picture process maps that provided more detailed guidance in the use of equipment were also provided.

According to the aircraft operator, the OM-15 was due for revision.

The aircraft operator had produced a number of training materials in support of their ramp operations training requirements. Those materials included a Ramp Student

Booklet for the A330, a number of electronic presentations, sample documents and learning guides and assessment forms.

Training and qualification

The OM-15 required the handling company to ensure that all personnel engaged in the handling of the operator's aircraft were trained to the applicable regulatory documents and the OM-15 requirements. The OM-15 requirements included training in the use of all ramp equipment and in aircraft loading techniques. Training and qualification records were also required.

In May 2009, the aircraft operator provided a 5-day trainer certification program for five handling company personnel. Those personnel had previous ground handling and training experience, but had minimal prior A330 or other wide-body aircraft experience. The trainer certification program comprised theoretical and practical training in the range of ground handling activities applicable to the A320 and A330 aircraft.

The operator-certified trainers had responsibility for training handling company personnel to the operator's standard using the aircraft operator's material. The training generally consisted of 3 weeks of classroom theory followed by ad hoc practical training. Opportunities for practical training were limited prior to the beginning of the contract and full access to the operator's A330s.

Records of personnel training and qualifications were kept by the handling company. There were reports that a representative of the operator had observed some personnel working unsupervised when they should not have been, and that the operator's representative was in the process of addressing those issues when this incident occurred.

Procedures

Loading

According to the loading schedule that was published in the OM-15, loading would normally commence 60 minutes before the aircraft's estimated time of departure (ETD). Twenty minutes before ETD, when loading was close to completion, the leading hand could commence finalising the LIR. Fifteen minutes before the ETD, when the load was secured, the LIR was to be delivered to the flight crew.

The operator's representative reported that there had been a 'toolbox' meeting before each flight, during which the leading hand briefed the team on their roles and handed out the inbound LIR. There was no documented requirement for such meetings.

Communications

The standard operating procedure for radio selection on departure was for flight crews to change frequency from the company's air-to-ground frequency during pushback.

The aircraft operator reported that there were no formal procedures documented for ground handling personnel to follow in case of an urgent operational matter arising

after the aircraft had commenced pushback. However, the standard process if the need arose was for personnel to:

- Contact the aircraft via very high frequency (VHF) radio on the company frequency.
- Contact air traffic control (ATC)/surface movement control via VHF and request the flight crew to make contact on the company VHF frequency.
- Contact the ATC tower by phone and request the flight crew to contact the company.

The ground handling personnel indicated that they were generally not aware of the standard process quoted above.

Team roles and responsibilities

Ramp supervisor

The ramp supervisor role was not specified in the OM-15. However, the role was described by the handling company as incorporating the supervision of ground handling personnel during a shift and providing direction and guidance, including role allocation. There was no documented training and assessment for the role. The ramp supervisor role could be combined with the leading hand role.

Leading hand

According to the OM-15, the leading hand's responsibilities included ensuring that ramp staff complied with the procedures stated in the manual and ensuring that the aircraft was loaded as directed by the PIC. In regard to A330 operations, the leading hand was also responsible for ensuring that the aircraft's underfloor load was distributed in accordance with the LIR and that any variations to the LIR were approved by the flight crew. All changes were to be recorded on the finalised LIR and the leading hand was required to sign it off. In practice, the leading hand was identifiable by always having custody of a clipboard with the paperwork for the flight.

Operator's representative

The operator's representative reported that they were not there to provide training or operational supervision, but to oversee the ground handler personnel's adherence to policy and procedures and the safety of the operation. Where necessary, the representatives coached and gave advice.

Operational risk management

Prior to the commencement of the contract, the aircraft operator conducted a risk assessment process to consider the handling company's ability to develop, train and/or acquire the necessary systems, people and equipment in readiness for the contract. That risk assessment identified 11 risks, including seven that related to lack of ground handling personnel experience with containerised aircraft.

In response to the seven experience-based risks, the following risk controls were identified:

- That a number of handling company personnel should be trained as in-house trainers.
- There should be in-house training of handling company personnel.
- A number of local aircraft operator personnel should perform management oversight of the ground handler's operation.
- Ramp trainer support should be provided for a defined transition period.
- Training materials should be provided to the ground handling contractor.

In response to the risk arising specifically from leading hand inexperience, an additional risk control of using experienced leading hands initially was recorded.

The aircraft operator planned to have management and trainer representation during the early stages of the contract to provide oversight as follows:

This oversight will ensure that the previously trained operational processes and post flight procedures are suitably validated and that these have been implemented and are functioning to the required service and safety standards.

The aircraft operator's representative reported that the experience of the contracted ground handling personnel was less than he expected and that this had required increased supervision and participation in the loading process by the operator's personnel, beyond the level of supervision originally anticipated.

Contract requirements

The contract service requirements included a section relating to on-time performance as follows:

Without compromising safety, in the event of a late arrival of an aircraft the Handling Company should aim to minimise the turnaround time to ensure departure is as near to scheduled departure time as possible.

Each departure/turnaround will have a dedicated and qualified Leading Hand that will not float between aircraft.

The contract also specified performance standards, including the following clauses:

If in the opinion of the Carrier, the Handling Company fails to meet these Service Standards then the Carrier reserves the right to withhold payment under this Agreement until the Service Standards are met to a satisfactory level in the opinion of the Carrier. The Handling Company further agrees:

(a) To forfeit 50% of the handling charge in the event that the Handling Company significantly contributes to an aircraft delay in excess of fifteen (15) minutes from the scheduled time of departure.

(b) To forfeit 75% of the handling charge in the event that the Handling Company significantly contributes to an aircraft delay in excess of thirty (30) minutes from the scheduled time of departure.

If the Service Standards continue to be unsatisfactory for a period of more than [1 month] then the Carrier may terminate this Agreement without further notice to the Handling Company and without limiting any other remedies available to the Carrier.

The ground handling personnel that were interviewed as part of this investigation were not aware of any penalties arising from a delayed departure.

Fatigue management

The aircraft operator specified that where the handling company used part-time personnel, those persons must undergo an awareness program concerning fatigue hazards associated with shift and part-time work.

It was reported that the rostering system used by the handling company incorporated fatigue management principles.

ANALYSIS

Introduction

The key safety focus in this occurrence was that the flight crew operated the aircraft without knowledge of freight that had been inadvertently loaded onto the aircraft. While the outcome was benign in this case, there was a risk that the loading of unauthorised freight could result in weight and balance anomalies and associated flight control and performance problems. There was also a risk of loading dangerous goods without the appropriate precautions.

The aircraft operator's loading process had a number of procedures to ensure the correct loading of freight onto its aircraft. This analysis identifies the key points where the system broke down and examines why those breakdowns occurred, along with any other risk factors identified.

Event analysis

The key events in the development of this occurrence were:

- The incorrect inclusion of unit load device (ULD) AKE 23532 with the booked freight on the freight terminal apron.
- That, in the absence of a load instruction report (LIR), the ground handlers that collected the freight from the freight terminal apron did not identify the ULD as non-booked freight.
- The arrival of the aircraft at the departure bay about 50 minutes before the scheduled departure time.
- After AKE 23532 was rejected by the pilot in command (PIC) and the ramp supervisor broadcast the message to the leading hand, the ULD was returned to the outgoing freight area of the departure bay.
- The loading of AKE 23532 in the aircraft's aft cargo hold in the absence of a leading hand and without PIC authorisation or reference on the loading instruction report.
- Communication confusion after it was discovered, prior to the aircraft taxiing, that AKE 23532 had been mistakenly loaded on the aircraft, with the result that the PIC was not advised of that load prior to departure.

There was insufficient information to establish how AKE 23532 was assembled on the freight terminal apron with the other freight booked on the flight. In that context, it is likely that reference was made to the ULD's previous booking details, or to the tranship label and that freight personnel assumed that the ULD was still booked on the flight. Given that the collation of freight on the apron was not considered by the investigation to be a safety critical task, the incorrect inclusion of AKE 23532 with the other freight was not considered to be a contributing safety factor.

The leading hand who collected the freight from the freight terminal reported checking the flight number details of the assembled freight and found them to all be correct. That check was carried out without reference to the LIR, which for practical

reasons, was not always available to the ground handlers at that stage of the loading process. Although it was likely that if the leading hand had a copy of the LIR, AKE 23532 would have been rejected at the freight terminal, it was not considered in the context to be a safety critical task at that stage of the process, and therefore not a contributing safety factor.

According to the aircraft operator's loading schedule, loading was due to begin at least 60 minutes before the scheduled departure time. So, when the aircraft arrived at the departure bay about 50 minutes before the departure time, loading was already at least 10 minutes behind schedule and, with a relatively complex load and inexperienced ground handling personnel, it got further behind. That delay created time pressure on the ground handling team and was a likely influence on some of the decisions made. While the aircraft's arrival time at the departure bay reduced the time normally assigned for aircraft loading, aircraft can and do run late for any number of reasons and the associated time pressure was considered to be a common condition that should not be classified as a contributing safety factor. There was no evidence that there was excessive pressure applied by the aircraft operator or ground handling company to load the aircraft in time for an on-time departure.

The procedure for verifying the suitability of freight during the aircraft loading process was followed and was successful in that AKE 23532 was identified as not being on the LIR and permission to load the ULD was sought from the PIC. After permission was denied, the ramp supervisor broadcast the information by radio. While the leading hand heard the broadcast, by then he was not directly involved in the aircraft's loading and played no further role. The other members of the team did not hear the broadcast or were not aware that the ULD was not to be loaded in either cargo hold. Significantly, the return of the ULD to the same location as freight that was still to be loaded would have given the impression that it was still available to be loaded in the yet-to-be-loaded aft hold.

There was no procedure or guidance for the quarantine of freight that was rejected during loading and, in the context of a relatively inexperienced ground handling team, this probably contributed to the inadvertent loading of the ULD.

The loading of the ULD without leading hand authorisation was contrary to the aircraft operator's procedures. However, the loading was running behind time relative to the aircraft operator's schedule and this was an influence on the ramp supervisor, who was also acting as leading hand at the time, leaving the aft cargo hold for the flight deck before loading was complete. Time pressure was probably an influence in the ineffective communication between the loader operators, operator's representative and the other ground handlers, leading to confusion about the status of the ULD.

The identification soon after pushback of the discrepancy between the aircraft's load and the LIR provided an opportunity for the flight crew to be alerted of the incorrect load before the departure. Instead, a combination of the flight crew changing from the company air-to-ground frequency to another frequency at pushback, and radio frequency confusion by the ground handling team led to the flight crew not being informed.

Ramp safety considerations

There was some confusion as to the roles and responsibilities of some of the key personnel participating in the loading. What was effectively a transfer of leading

hand responsibilities from the nominated leading hand to the ramp supervisor during the loading process was ill-defined and created uncertainty as to who was the leading hand. Added to that was the ramp supervisor's incomplete training for the leading hand role. Those factors were not necessarily influential in this occurrence, but were nevertheless contrary to the aircraft operator's procedures and contract requirements, and increased the risk of loading anomalies occurring.

It was evident that the role of the operator's representative during the loading process was also unclear to some of the ground handling team. That might have contributed to the ramp trainer considering the operator's representative as a quasi leading hand and apparently loading the ULD on his tacit authorisation. Although it was reported as standard practice to have a pre-turnaround briefing involving all of the ground handling personnel assigned to a flight, there was no evidence that there was such a briefing involving all of the participants prior to the incident. Clear specification of the roles of all of the personnel involved and particularly the leading hand before each unload/load operation would reduce the risk of loading anomalies occurring.

The 'No-Fit' position in the aft cargo hold was not checked by a leading hand before the hold's door was shut. Although there was no report of any anomaly in the deployment of the cargo locks, and therefore no contribution to the occurrence, the No-Fit position check was an aircraft operator requirement and an important risk control for the security of the underfloor load.

The aircraft operator's procedures did not include a means for ground handling personnel to communicate effectively with the flight crew in the event of an urgent operational matter occurring after pushback. The absence of such procedures increased the risk of communication difficulty and an aircraft departing in an unsafe condition that was not known by the flight crew.

All of the ground handling contractor's personnel were inexperienced in wide-body aircraft operations and, at the time of the occurrence, had only been fulfilling the contract for 10 days. That inexperience probably did have some influence in the occurrence, but was not considered to be a safety factor as it was largely unavoidable in the context of the new contract and was a recognised risk on the part of the aircraft operator, and was mitigated through a number of risk controls.

The performance standards and financial penalties specified in the ground handling contract had the potential to influence the handling company to achieve on-time departures to the detriment of safety. However, the ground handling personnel involved in the loading of the flight on the day of the incident were not aware of any penalties and were expecting a sanction-free period during the early stages of the contract. In those circumstances, it is unlikely that the contractual performance standards had any significant effect on the incident.

Some of the personnel involved in the ground handling had been working on consecutive days since the contract started and reported that they were tired or even exhausted. That appeared to be associated with the high workload involved in the early stages of the contract and with the rostering system reportedly in place but was unlikely to continue. In any event, there was no link established between personnel tiredness or fatigue and the development of the occurrence.

Aircraft ground handling is generally a complex logistical task in a time-pressure environment that requires trained and alert individuals to work in a team structure to clear and efficient procedures.

FINDINGS

From the evidence available, the following findings are made with respect to the aircraft loading event that occurred at Sydney Airport on 4 July 2009 and involved Airbus A330-202 aircraft, registered VH-EBB. They should not be read as apportioning blame or liability to any particular organisation or individual.

Contributing safety factors

- Although unit load device (ULD) AKE 23532 was rejected by the pilot in command before it was loaded in the forward cargo hold, the status of the ULD was not clearly communicated to the ground handling team and it was returned to the outgoing freight holding area of the departure bay.
- Contrary to the aircraft operator's procedures, unit load device AKE 23532 was loaded onto the aircraft in the absence of a leading hand and without reference on the loading instruction report or the authorisation of the pilot in command.
- After it was discovered that unit load device AKE 23532 had been mistakenly loaded on the aircraft, there was confusion in the communication of that information and the flight crew operated the flight to Melbourne without knowledge of the mis-loading.
- There was no procedure or guidance for the segregation of freight that was rejected during loading.

Other safety factors

- The ramp supervisor assumed the role of leading hand without having the required practical experience to conduct the role unsupervised and without clearly communicating that role change to the ground handling team.
- Contrary to the aircraft operator procedures, the No-Fit positions in the aft cargo hold were not checked for correct lock engagement by a leading hand.
- The aircraft operator did not provide procedures that allowed ground handling personnel to communicate effectively with the flight crew in the event of an urgent operational matter occurring after pushback. [*Minor safety issue*]

Other key findings

- Despite the unauthorised carriage of the unit load device onboard the aircraft, the aircraft remained within weight and balance limits and there were no adverse effects on the handling or performance of the aircraft.
- No link was established between the reported ground handling personnel tiredness or fatigue and the development of the occurrence.

SAFETY ACTION

The safety issues identified during this investigation are listed in the Findings and Safety Actions sections of this report. The Australian Transport Safety Bureau (ATSB) expects that all safety issues identified by the investigation should be addressed by the relevant organisation(s). In addressing those issues, the ATSB prefers to encourage relevant organisation(s) to proactively initiate safety action, rather than to issue formal safety recommendations or safety advisory notices.

All of the responsible organisations for the safety issues identified during this investigation were given a draft report and invited to provide submissions. As part of that process, each organisation was asked to communicate what safety actions, if any, they had carried out or were planning to carry out in relation to each safety issue relevant to their organisation.

Aircraft operator

Communication procedures

Minor safety issue

The aircraft operator did not provide procedures that allowed ground handling personnel to communicate effectively with the flight crew in the event of an urgent operational matter occurring after pushback.

Action taken by the aircraft operator

In response to this occurrence, the aircraft operator reported implementing procedures to enable ground handling agents to make emergency contact with flight crew after pushback and provided scenarios in which such emergency contact may be necessary. Those procedures were incorporated in the operator's *Ground Operations Manual*.

ATSB assessment of response/action

The ATSB is satisfied that the action taken by the aircraft operator adequately addresses the safety issue.

Proactive safety action

As a result of this occurrence, the aircraft operator advised taking the following additional proactive safety action:

- The personnel that were directly involved with the loading of the aircraft were retrained in accordance with the operator's loading policy and procedures.
- The ground operations department established and communicated 'Port Cutover Support Team' guidelines to all staff associated with the training and support of new ports or ground handling agents. The guidelines outlined the roles, responsibilities and authority of personnel involved in new operations, encompassing such things as the: rectification of errors during a turnaround,

investigation/confirmation of ground handler knowledge, reinforcement of correct process, and prioritisation of learning over schedule.

- The aircraft operator's *Ground Operations Manual* was updated to incorporate greater specificity to the roles of supervisory staff involved in the loading of aircraft.
- The flight and ground crew manuals were amended to include further loading procedures to prevent the carriage of unit loading devices (ULD) that were not planned for carriage on a particular flight. The additional policy and procedures stated that:
 - Cargo ULDs may only be uplifted on a flight if they have been included in the 'Preliminary' section of the load instruction report (LIR) by the Load Planner.
 - If cargo ULDs are presented for a flight that have not been included in the 'Preliminary' section of the LIR, the Leading Hand or Flight Crew may contact the Load Planner to request a revised LIR and Notice To Captain (NOTOC).
 - Cargo must not be uplifted under any circumstances unless it has been included in the 'Preliminary' section of the LIR by the Load Planner.

Freight operator

Proactive safety action

The investigation did not identify any organisational or systemic issues that might adversely affect the future safety of the freight operator's operations at Sydney Airport. However, as a result of this incident, the freight operator reviewed and changed its process in the case of 'replanned' ULDs that were already on the tarmac apron to include their being re-placarded with the new flight details.

The revised process will be subjected to an internal audit later in 2011.

APPENDIX A: LOAD INSTRUCTION REPORT

The following copy of the load instruction report has been digitally altered to remove information that could identify the aircraft operator or personnel. In the preliminary load plan, position 43L (outlined in green) was originally assigned to baggage, but was not required and was changed to a No-Fit (outlined in red) in the final load distribution. ULD AKE 23532 was actually loaded in that position.

FINAL

330-200 LOAD INSTRUCTION REPORT

330-200

Flight No. JQ0035	From SYD	To MEL
Aircraft Registration VH-EBB	Flight Date 04/07/2009	Prepared By Issue 5

FORWARD CARGO HOLD

COMPARTMENT 1	COMPARTMENT 2	COMPARTMENT 3	COMPARTMENT 4	COMPARTMENT 5
<p>11L AKE DPS BYDT 37 PCS</p> <p>12P PAX 37540F MEL C 750 KG</p> <p>14L AKE 23530OF MEL C 425 KG</p> <p>AKE 37950OF MEL C 460 KG</p> <p>14R</p>	<p>21P AAF 32501SQ MEL M 1190 KG</p>	<p>31P PAX 428170F MEL C 2765 KG</p>	<p>41L AKE MEL BY 40 PCS</p> <p>AKE MEL BY 40 PCS</p> <p>41R</p>	<p>51 EMPTY</p>

AFT CARGO HOLD

COMPARTMENT 1	COMPARTMENT 2	COMPARTMENT 3	COMPARTMENT 4	COMPARTMENT 5
<p>23L AKE 238380F DPS C-T 1570 KG</p> <p>AKE 375580F DPS CT 505 KG</p> <p>23R</p>	<p>31P PAX 428170F MEL C 2765 KG</p>	<p>32P PAX 420080F MEL C 1970 KG</p>	<p>42L AKE MEL BY 40 PCS</p> <p>AKE MEL BY 40 PCS</p> <p>42R</p>	<p>52 MEL BY 4 PCS</p> <p>DPS MT 8 KG</p> <p>53 EMPTY</p>

ULID	AS ABOVE	AS ABOVE	AS ABOVE	AS ABOVE	AS ABOVE	AS ABOVE	AS ABOVE	AS ABOVE	AS ABOVE	AS ABOVE	AS ABOVE	AS ABOVE	AS ABOVE	AS ABOVE	AS ABOVE	AS ABOVE	AS ABOVE		
11L	<input type="checkbox"/>	12L	<input type="checkbox"/>	13L	<input type="checkbox"/>	14L	<input type="checkbox"/>	15L	<input type="checkbox"/>	16L	<input type="checkbox"/>	17L	<input type="checkbox"/>	18L	<input type="checkbox"/>	19L	<input type="checkbox"/>	20L	<input type="checkbox"/>
21L	<input type="checkbox"/>	22L	<input type="checkbox"/>	23L	<input type="checkbox"/>	24L	<input type="checkbox"/>	25L	<input type="checkbox"/>	26L	<input type="checkbox"/>	27L	<input type="checkbox"/>	28L	<input type="checkbox"/>	29L	<input type="checkbox"/>	30L	<input type="checkbox"/>
31L	<input type="checkbox"/>	32L	<input type="checkbox"/>	33L	<input type="checkbox"/>	34L	<input type="checkbox"/>	35L	<input type="checkbox"/>	36L	<input type="checkbox"/>	37L	<input type="checkbox"/>	38L	<input type="checkbox"/>	39L	<input type="checkbox"/>	40L	<input type="checkbox"/>
41L	<input type="checkbox"/>	42L	<input type="checkbox"/>	43L	<input type="checkbox"/>	44L	<input type="checkbox"/>	45L	<input type="checkbox"/>	46L	<input type="checkbox"/>	47L	<input type="checkbox"/>	48L	<input type="checkbox"/>	49L	<input type="checkbox"/>	50L	<input type="checkbox"/>
51L	<input type="checkbox"/>	52L	<input type="checkbox"/>	53L	<input type="checkbox"/>	54L	<input type="checkbox"/>	55L	<input type="checkbox"/>	56L	<input type="checkbox"/>	57L	<input type="checkbox"/>	58L	<input type="checkbox"/>	59L	<input type="checkbox"/>	60L	<input type="checkbox"/>

MAX COMPARTMENTS 1 AND 2: 18 869 KG

MAX COMPARTMENTS 3 AND 4: 15 241 KG

MAX 3 465 kg

Notes:

LOAD PLANNING ISSUES CALL
CABIN CREW BAGS 43R // TECH CREW BAGS 11L
PLS ENTER BAG ULD NUMBERS

I certify that the aircraft has been loaded with the distribution of deadweight as described above; any last minute changes have been included by way of amendment to this document; the load has been secured as per company instructions; all ULDs loaded at this port have been inspected at aircraft side for serviceability and appropriate corrective action has been taken for damage prior to departure; and the aircraft is AAA compliant.

Print Name: _____ Signature: _____

Note: Once completed, this form may only be amended by the signatory. 1st Edition: 2005

APPENDIX B: SOURCES AND SUBMISSIONS

Sources of Information

The sources of information during the investigation included the:

- flight crew of VH-EBB (EBB)
- operator of EBB
- ground handling personnel
- ground handling company
- freight operator.

Submissions

Under Part 4, Division 2 (Investigation Reports), Section 26 of the *Transport Safety Investigation Act 2003* (the Act), the Australian Transport Safety Bureau (ATSB) may provide a draft report, on a confidential basis, to any person whom the ATSB considers appropriate. Section 26 (1) (a) of the Act allows a person receiving a draft report to make submissions to the ATSB about the draft report.

A draft of this report was provided to the aircraft operator and flight crew, the ground handling company, key ground handling personnel, the freight operator and the Civil Aviation Safety Authority. A submission was received from the aircraft operator. That submission was reviewed and, where considered appropriate, the text of the report was amended accordingly.

Aircraft loading event - Sydney Airport, NSW, 4 July 2009
VH-EBB Airbus A330-202