

Service Provider Investigations: New Opportunities

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Note: *The views, thoughts and opinions expressed in this paper are those of the authors and may not necessarily reflect the policy or position of the Qantas Group, ATSB or other entities.*

Biographies

Richard Davies (MO6219)

Richard served 12 years in the RAAF as a pilot; as a maritime patrol aircraft commander, and then as a flying instructor at the ab-initio flying training school and an operational maritime patrol squadron. He was a Unit or Base Flying Safety Officer at his various postings. After leaving the RAAF Richard joined Qantas Airlines, where he has flown Boeing 767, Boeing 747-400, and Airbus A380 over the last 23 years. As a result of his RAAF experience, Richard was seconded into Qantas's Group Safety department as an investigator, auditor, and trainer. He has accumulated in excess of 17,000 flying hours, and post graduate qualifications in safety management. He is the founder and a director of Aviation Safety Institute.

Paula Gray (MO6902)

Paula had an unusual start in aviation, as a DC3 Flight Attendant for an Australian charter operator. This led to a position within Air Traffic Control conducting fatigue analysis. She commenced her investigation career with Jetstar Airways in 2006 and has held numerous safety and investigation roles within the Qantas Group, including Manager Standards and Assurance Investigations within the Group's shared safety services model. Paula currently holds the position of Manager Service Delivery where she continues to train and mentor staff in investigations and report writing. She holds several tertiary qualifications including a Master of Science and Technology (Aviation).

Wayne Jones

Wayne has over 30 years' experience as an aviation professional. He is an aviation consultant, manager and technician. Wayne's most recent engagement was as the Safety Management Consultant for ICAO where he was intensely involved in the development of materials in the implementation of Annex 19 'Safety Management' Amendment 1. He performed with distinction in a number of roles at Australia's CASA, including: Standards Implementation Manager, Manager Safety Management Systems and Human Factors, Program and Project Manager, Air Transport Inspector, and Education Specialist. At CASA, as International Programme Leader, Wayne mentored the Indonesian DCGA to develop their State Safety Program.

Introduction

Approximately 4.1 billion travellers flew safely on 41.8 million flights in 2017. The rate for major jet accidents (measured in jet hull losses per 1 million flights) was 0.11, which is the equivalent of one major accident for every 8.7 million flights. There were no fatal accidents of IATA member airlines in 2017..

“The top-line safety figures for 2017 convey a persuasive message about our industry: flying is safe. The reasons are simple. There were no passenger fatalities on jet transport aircraft last year.”
Gilberto Lopez Meyer, Senior Vice-President Safety and Flight Operations, IATA.

The 2017 ICAO Safety Report identifies that accident statistics for the last five years show a decrease in both the number of accidents as well as the accident rate. In 2016 the downward trend in the number of accidents continued with an 18 per cent decrease from 2015. Over the same period there was an increase in scheduled commercial departures. The result is a global accident rate of 2.1 accidents per million departures; down by 25 per cent from 2015. The ICAO stated aspiration safety goal is ‘zero fatalities world-wide’. This objective now seems possible if the trend persists.

“We cannot and shall not pat ourselves on the back and say, ‘job done’ because, of course, it is not.”
Stephen Hough, Chairman, IATA Accident Classification Technical Group

These improvisations in safety performance were made possible by the prodigious efforts of professionals throughout our industry; notably including accident and incident investigators. The predominately downward trend in accidents (although acknowledging the events of 2018) conceivably provides us with an opportunity to reconsider the role of State Accident Investigation Authorities, and their investigators. This paper will propose that they are well situated to play a major role in the continued progression of the safety performance of the State by leveraging their vast knowledge of safety investigation to empower industry safety efforts. This may enable a move from reactively responding to accidents and serious incidents to one of cooperatively skilling and supporting service providers¹ to address incidents and safety issues with more robust insight, therefore diminishing the opportunities for escalation of occurrences.

High Level Guidance - GASP

ICAO Doc 10004 Global Aviation Safety Plan (GASP) 2017-19 established a strategy for prioritization and continuous improvement of global aviation safety. The GASP and the Global Aviation Navigation Plan (GANP) promote coordination and collaboration among international, regional and national initiatives aimed at delivering a harmonized, safe and efficient international civil aviation system.

The GASP ‘objectives’ call for States to put in place robust and sustainable safety oversight systems and to progressively evolve them into more sophisticated means of managing safety. These objectives align with ICAO’s requirements for the implementation of State Safety Programmes (SSP) by States and safety management systems (SMS) by service providers. The objectives are set in the context of growing passenger and cargo movements world-wide and the need to address efficiency and environmental challenges.

The GASP sanctions States to make safety improvements through four ‘safety performance enablers’:

- Standardization,
- Resources,

¹Service providers consist of: approved training organizations that are exposed to safety risks during the provision of their services, aircraft operators, approved maintenance organizations, organizations responsible for the type design and/or manufacture of aircraft, air traffic service providers, and certified aerodromes.

- Collaboration and
- Safety information exchange.

A global 'aviation safety roadmap' has also been developed to provide guidance to assist the entire aviation community to ensure safety initiatives deliver the intended benefits associated with the objectives in a coordinated manner, thus reducing inconsistencies and duplication of effort.

To contextualize these safety endeavours, the GASP requests Regions and States establish regional and national 'safety plans'. The national safety plans should include goals and targets which are consistent with the regional safety plan, aligned with the GASP objectives, and based on the nations operational safety needs.

Further, the GASP requires SSP's to implement a risk-based approach to achieve an 'acceptable level of safety performance' (ALoSP). The acceptable level of safety performance is defined as 'the minimum level of safety performance of civil aviation in a State, as defined in its State safety programme, or of a service provider, as defined in its safety management system, expressed in terms of safety performance targets and safety performance indicators'. The GASP advocates that international organizations work with their members to help them develop their safety performance indicators (SPIs) and provide guidance material and training to assist with addressing global safety priorities and SMS implementation. To ensure congruence between SSP and SMS indicators, States are urged to actively engage service providers in the development of SMS SPIs.

In this context, the role of the State evolves to include the establishment and achievement of safety performance targets as well as effective oversight of its service providers' SMS. Collaborative efforts between key stakeholders, including service providers and regulatory authorities, are essential to the achievement of safety performance targets. Coordination of safety management activities between States, as well as across all operational domains, is essential. Some of the key aviation stakeholders include, but are not limited to: ICAO, States, regional accident and incident investigation organizations (RAIOs), industry representatives, air navigation service providers, operators, aerodromes, manufacturers, and maintenance organizations.

Management of Safety – Annex 19

ICAO Annex 19 supports the continued evolution of a proactive strategy to improve safety performance. The foundation of this proactive safety strategy is based on the implementation of a State safety programme that systematically addresses safety risks. This requirement provides the regulatory authority to the GASP intent.

The SSP applies to all relevant State authorities or agencies. Annex 19 notes that 'relevant authorities or agencies' is used in a generic sense to include all authorities with aviation safety management and oversight responsibility which may be established by States as separate entities, such as: Civil Aviation Authorities, Airport Authorities, ATS Authorities, Accident Investigation Authority, and the Meteorological Authority.

Specifically, SSP's – including Accident Investigation Authorities – have a role in the establishment of the State's safety programme, establishing safety performance indicators and safety performance targets, and work together with industry to identify harmonized safety metrics that will enable sharing and exchange and safety analysis to identify and mitigate safety risks. All with the expressed aim of improving the safety performance of the State.

Annex 19 also heeds that the purpose of the safety data and safety information analysis performed by the State is to identify systemic and cross-cutting hazards that might not otherwise be identified by the safety data analysis processes of individual service providers and operators.

Hazard Identification – Annex 19

It is clear what the State's responsibilities are with regard to safety performance, but what of service providers? In relation to safety management, Annex 19 uses the term "service provider" to refer to a very specific range of organizations (listed in its Chapter 3) which are required to implement and employ safety management systems to mitigate safety risks.

These organizations include, but is not limited to:

- certified operators of aeroplanes or helicopters in accordance with Annex 6
- operators of a certified aerodrome, in accordance with Annex 14, and
- ATS providers, in accordance with Annex 11.

It is notable that ICAO Doc 9859 Safety Management Manual – which provides guidance to Annex 19 – uses the term service provider more broadly to refer to an aviation industry organization implementing safety management systems, whether on a mandatory or voluntary basis.

Annex 19 requires service providers to develop and maintain a process that ensures analysis, assessment and control of the safety risks associated with identified hazards. It requires that service providers conduct hazard identification which is based on a combination of reactive and proactive methods. The SMM notes that there are a variety of methods for hazard identification; one of these being the results of internal safety investigations.

Some conditions which may merit more detailed investigation by the service provider include:

- Reactively: When the organization experiences an unexplained increase in aviation safety-related events or regulatory non-compliance; or
- Proactively: When there are significant changes to the organization or its activities (otherwise known as change management).

The SMM states that hazard identification by service provider safety investigations be continuous and part of the service provider's ongoing activities.

State Safety Data Analysis – Annex 19

Annex 19 Chapter 5 requires States to establish safety data collection and processing systems (SDCPS) to capture, store, aggregate and enable the analysis of safety data and safety information. The objective of the SDCPS is to ensure the continued availability of safety data and safety information in support of their safety management activities.

Related to the SDCPS, is the requirement for States to establish a mandatory safety reporting system that include the reporting of incidents and a voluntary safety reporting system for the collection of other safety data and safety information not captured by the mandatory safety reporting system. Annex 19 recommends that State authorities responsible for the implementation of the SSP have access to the SDCPS, and specifically notes that this includes accident investigation authorities.

Annex 13 also requires States to establish and maintain an accident and incident database to facilitate the effective analysis of information on actual or potential safety deficiencies and to determine any preventive actions required. Annex 13 points out that the aim of this is to promote accident prevention by collection and analysis of safety data and by a prompt exchange of safety information, as part of the State safety programme. These requirements, as mentioned above, are also included in Annex 19 and, to this effect, are applicable to Annex 13.

The Opportunity

State Accident Investigation Authorities have made a significant contribution to the world's improved safety record. Their professional and diligent approach to their discipline provides a model and an inspiration to the whole aviation industry, and wider. State Accident Investigation Authorities and individual investigators are highly skilled. They have garnered knowledge and skills from their activities and have much to contribute to continued safety improvement of global aviation, as aviation investigation practitioners, educators and mentors to service provider safety investigators.

State Accident Investigation Authorities investigations are extremely effective at analyzing actual occurrences – accidents and serious incidents – and disseminating the lessons learned to reduce the likelihood of similar events in future.

Service provider safety investigations differ in scope and severity but, the intention is the same; to reduce the consequences and/or likelihood of similar negatively impacting occurrences in the future. Service provider safety investigations have the benefit of shorter cycle times. They learn and apply the lessons learned quickly and effectively. The two investigation types have, arguably, equal value. What many service provider safety investigations lack, though is:

- deep skills and experience, and exposure to the tools necessary to conduct safety investigations to the same degree of rigor and quality as State safety investigations.
- standardized approaches.
- the authority and the mandate to investigate safety incidents or hazards which transcend organizational boundaries. In many cases the boundaries themselves (the organizational interfaces) are a significant source of risk.

Consequently, this has provided a significant opportunity to better understand service providers safety investigations: and their link to the State Safety Programme.

State Safety Programmes and the Link to Service Provider Safety Investigations

“As aviation safety professionals, we must keep focus and continue with our work: the promotion of safety first.”

IATA

State Accident Investigation Authorities are ideally situated to play a major role in the continued progression of safety performance of the State by refining the relationship between service providers and State Accident Investigation Authorities and refocusing the role of the Accident Investigation Authorities from a largely reactive stance to a proactive one where State Accident Investigation Authorities and service provider safety investigation teams work more closely to improve the safety performance of each individual service provider and the overall safety performance of the State. State Accident Investigation Authorities have:

- Privileged access to safety data and information from across all sectors in the State, and from other States. This information can be judiciously shared with service provider safety teams to proactively improve their safety performance.
- Skilled and competent investigators who are in a position to educate and mentor service provider safety investigators, driving better quality, more sophisticated and more standardized service provider safety investigations.
- Cross-sector vision and access contributing to more comprehensive cross-sector investigations addressing hazards within and between sectors.

The Service Provider's Contribution

The maturity and quality of service provider SMS's and investigations varies across the world. From investigation reports with organizational and root cause analysis that are large in both breadth and depth, to assessments examining only the technical aspects of an occurrence, to the non-existent.

Recent industry mergers and acquisitions have forced service providers to consolidate, downsize, or do more with less (Air Line Pilots Association, cited in Tsujimoto 2014), and this includes safety and investigation personnel. State-run investigations will ultimately provide assurance to the service provider that the traditional safety of flight aspects of an occurrence are thoroughly examined. The service provider however, can make their own contribution to the improvement of safety through their own internal investigations in a variety of ways, even with limited resources.

Analysis of areas that are traditionally outside the scope of State run investigations such as ground operations, workplace health and safety, environment, corporate policy and culture are valuable in revealing systemic issues that lie dormant within an organization, and ultimately lead to safety of flight risks. A quality internal investigation that examines these areas will always be of benefit to the service provider, however the concept of a joint investigation with the State opens-up the opportunity to share resources and widen the investigation scope.

The service provider has the advantage of having immediate access to information and evidence, especially perishable evidence, in the initial stages of an investigation. Most investigators would agree, waiting on third parties for relevant data is the source of much frustration. While legislation dictates that formal notices requesting information from a service provider are required, a close working relationship between the parties will result in the State obtaining this information in far shortened timeframes. Evidence such as crew rosters, company owned Closed Circuit Television (CCTV) footage, manuals, procedures and access to crew can all be obtained quickly, resulting in the initial analysis being conducted and risks quickly identified and treated.

Further, Annex 19 Chapter 5 requires the State to establish safety data collection and processing systems, providing them access to safety data and information across all sectors. Service providers can contribute their own internal data analysis, trending and information on similar occurrences outside of State interests, such as ground operations occurrences. If utilized this data can lead to a more robust analysis resulting in a quality report.

For service providers with limited budgets, the possibility of leveraging off the State's technology and resources also exists. Flight data analysis and animations, human factors analysis and laboratory testing for example, may not be within the reach of all service providers. The State however, may have the facilities to process information, and in turn reap the benefits from obtaining a broad range of data from the Service Provider, that may not be accessible in current conditions. For this to occur an environment of trust needs to be well established.

As previously discussed, the State can provide mentorship to less experienced investigators representing the service provider, however, the service provider can make their own contribution in the form of Subject Matter Experts to support the State.

Having access to consult with operational staff on internal policies, procedures and the culture of an organization, outside of formal interviews is invaluable for any investigator. Such consultation will ultimately result in a better understanding of internal processes and company culture, which in turn will produce a quality report. This knowledge need not be discarded by the State at the end of the Investigation, but retained for future investigations for, or preferably with, that service provider.

All of the above ultimately points to timeliness and capacity. Hazards uncovered can be treated in a timelier manner due to the service providers access and proximity to the topics of the investigation.

Operational crew can be returned to duty promptly when risks are identified and treated, rather than being withheld from service until an investigation report is released. The State can produce their reports quicker and provide more capacity for additional workload. Expedient action and maximum usage of available resources is essential in minimizing disruption to our ultimate goal of the business of transporting passengers and goods safely.

Teamwork beyond the State and a Single Service Provider

The value of teamwork outside the organization should also be considered through the concept of sharing organizational investigations with competitors. While it is common for service providers to regularly review published reports produced by State run investigations, airlines in particular have traditionally kept their own internal reports closely guarded for commercial reasons.

Competitor investigation reports relating to commonly used aircraft, airports, contractors and systems are extremely useful for internal learnings and change, often without the expense of conducting an internal investigation. States can assist this in the provision by providing a neutral platform for information sharing.

In recent years the Qantas Group and Virgin Australia have made the first tentative steps in sharing reports. To date this has been limited to a non-commercially sensitive severe weather event occurring at a common regional airport with a shared ground handling contractor (Qantas Group, 2015) which was outside the scope of the State. Data and draft reports were shared and discussed. The result was consistent findings and actions to address common risks, as well as formation of useful business relationships between safety departments for future events.

Further talks have continued between the two airlines, and other operators within Australia on the sharing of information and investigation processes by forming an airline investigation working group. Small steps but important ones, as the State could benefit from these budding inter-service provider relationships by leading joint investigations into similar occurrences with input from not just service providers, but potentially manufacturers, airports, air traffic control organizations and so on.

Case Study: QantasLink Tail Strike Organizational Investigation

Source: Australian Transport Safety Bureau



The Occurrences

On 5 December and 11 December 2013 QantasLink, the regional airline for the Qantas Group, experienced two separate Bombardier Dash 8-Q400 (Q400) tail strikes in Brisbane (registration VH-QOT) and Roma (registration VH-QOS) in Queensland, Australia. Both aircraft sustained minor abrasion damage to the underside fuselage and buckling of internal structures in the area of the tail strike sensor. There were no injuries to passengers or crew.



Source: ATSB

Figure 1 - Damage to tail section of VH-QOT (looking aft)



Source: ATSB

Figure 2 - Damage to tail section VH-QOS (looking aft)

The two occurrences had numerous commonalities, including:

1. The pilot flying was a trainee First Officer (FO) under line training, supervised by a Training Captain operating as pilot monitoring;
2. The undesired aircraft state that led to the tail strike occurred in the last 50ft of the landing; and
3. The pilot flying did not adequately manage the engine power levers during the flare which contributed the declining energy state, causing them to inadvertently pitch up to control the descent rate which exceeded maximum pitch angles.

QantasLink immediately launched an internal investigation in response to the first occurrence. On being notified of the second occurrence a decision was made to conduct one in-depth internal investigation to examine possible contributing systemic and organizational factors. This investigation was conducted simultaneously with the State's (ATSB) investigation.

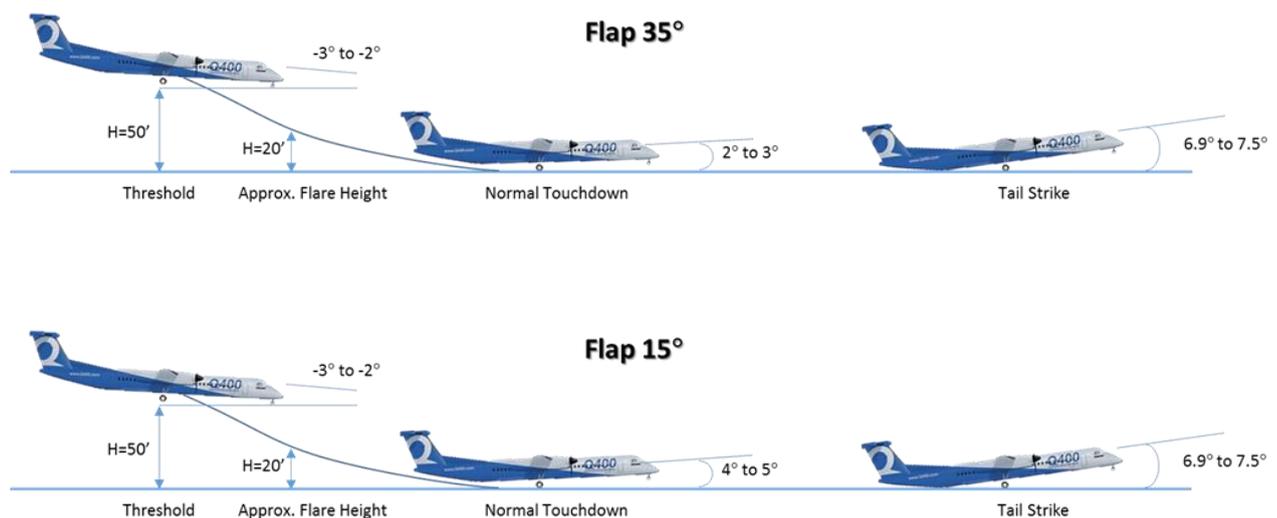
The Qantas Group adheres to a Just Culture² when conducting investigations and inquires. There was a strong focus on organizational factors and how the *system* let down the crew, rather than punitive action taken against individuals.

Limited resourcing led to the allocation of one Lead Investigator who was supported by numerous Subject Matter Experts. The investigation took several months and revealed surprising results that extended well beyond pitch attitudes and aircraft handling skills. This generated significant change within the organization.

The Aircraft

Due to the design and length of the fuselage of the Q400, there is a relatively small margin between a normal flare angle and a tail strike angle (AAIB, 2017). The aircraft can experience tail contact on landing at pitch attitudes from as low as 6.9°. While the Q400 has a “touched runway” sensor to indicate when tail contact has occurred, it does not have a warning system to alert Flight Crew that they have exceeded a pitch attitude limitation.

Flight data revealed that VH-QOT registered a pitch attitude of 7.5° and VH-QOS registered a pitch attitude of 8.4°.



Source: QantasLink

Figure 3 - Q400 Flap 35 and 15 approach pitch attitude change

Data

The investigation revealed that approximately five months prior to the tail strikes, as part of their regular flight data review process, QantasLink had identified an emerging trend in high pitch attitudes during landing.

In response, a focused analysis was commenced and remained ongoing at the time of the occurrences. The analysis revealed that the trend directly related to high pitch attitude landings being conducted by FO's under training. The QantasLink Trainee Program immediately became the main area of focus of the investigation.

²Just Culture" is a culture which recognises that the majority of human actions that are unsafe are not deliberate. Just Culture encourages an atmosphere of trust in which people are encouraged, even rewarded, for providing essential safety-related information, but where gross negligence, wilful violations and destructive acts are not tolerated.

QantasLink Training Program

At the time of the occurrences, trainee FO's were required to complete the following training prior to commencing line operations:

- The QantasLink Induction program;
- Q400 ground courses, including viewing a Bombardier pitch awareness video;
- Q400 endorsement program comprising of four fixed-base procedural training sessions and 12 full flight simulator training sessions; and
- Between 75 and 100 hours of line training on revenue flights under the supervision of a Training Captain, followed by a check-to-line assessment.

Timeframes

Investigation interviews were broadened a larger group of trainee FO's to seek feedback on their experience of the training program. Most trainees advised that their simulator and ground training was sporadic due to a combination of simulator unavailability and rostering. Analysis of trainee rosters supported this assertion, with large gaps between training sessions noted for numerous trainees.

Allowing for days off and rest, endorsement training should typically take between 20 and 30 days to complete (ATSB, 2016). The rosters of two trainees involved in the tail strikes revealed their ground school took a total of 50 days and 55 days. Such sporadic training may not provide trainees with adequate opportunity to consolidate and retain newly-learned skills (ATSB, 2016).

Syllabus and techniques taught

Training at the time included minimal normal landings and did not include any specific training to address the risk of tail strike. The ATSB's investigation identified that *"varied emphasis on the appropriate handling technique and pitch attitude awareness during first officer training did not assure consistent application of an appropriate landing technique in the Dash 8-400 aircraft"* (ATSB 2016). Trainees also revealed during interview that they felt that that landing techniques taught, varied between Training Captains both in the simulator and during line training.

In response QantasLink made numerous changes to their training program including:

- Changes to Training Captain selection criteria and training;
- Amendments to Training Captain proficiency lesson plans to include pitch attitude monitoring, dedicated training to raise awareness of potential candidate errors and intervention/recovery training;
- Implementation of a pitch attitude monitoring and landing recovery training session as part of cyclic simulator training and proficiency program; and
- Implementation of a new rostering protocol that required additional training events if an FO's training was disrupted by a period of more than 7 days.

Lack of Guidance

Bombardier provided landing guidance in its Q400 aircraft operating and flight manuals. Normal landings could be conducted with any combination of Flap 15 or Flap 35 and a propeller Revolutions Per Minute (RPM) setting of 850 or 1,020. A preferred or optimal landing configuration was not specified. The selected landing configuration was at the discretion of the Captain.

At the time of the occurrences, QantasLink did not provide any landing configuration guidance or information in addition to that provided by Bombardier, nor was a preferred or optimal landing configuration specified.

In response, QantasLink communicated and incorporated the following into their operations manuals;

- Additional information and guidance on landing techniques covering the approach, flare, and appropriate use of engine power;
- Cautioning that reducing power to idle close to the ground or in the flare may cause a sudden and unexpected increase in drag, along with a reduction of lift;
- Cautioning that should a higher-than-normal decent rate be experienced during the landing phase, the temptation to control this decent rate by pitching up must be avoided;
- A requirement that all Flight Crew were to review the Bombardier pitch awareness video by a set date;
- A reminder to Flight Crew of the standard pitch awareness calls and associated actions; and
- Guidance for bounced and skipped landing recovery.

Further, Bombardier reviewed their landing guidance and pitch awareness video and communicated to all Q400 operators via a Flight Operations Service letter which included;

- Reminders of the intent of the pitch awareness video;
- While some Q400 tail strikes have occurred due to unstable approaches, all Q400 tail strikes occur as a result of not respecting the Aircraft Flight Manual Caution of 6° during the landing flare; and
- Management of the absolute pitch attitude during the landing flare to less than 6° at touchdown, as well as increasing power to reduce the sink rate will help Flight Crew avoid tail strikes.

Analysis revealed that in the 12 months following the introduction of the QantasLink and Bombardier safety measures, the number of high pitch attitudes during landing reduced significantly. To date there has not been another tail strike in the QantasLink fleet of Q400's or other Dash 8 variants.

While this case study is a good news story, resulting in underlying risks being identified and treated, potentially the investigation process could have taken a different approach: a meeting of minds and exchange of valuable safety data and expertise. A joint investigation between the service provider (QantasLink), the State (ATSB) and Manufacturer (Bombardier) could have reaped the benefits of additional resourcing, a broader range of expertise, mentoring, immediate access to data which may have led to a swiftly released joint report with recommendations, relevant to all Q400 operators world-wide.

Summary

The GASP objectives call for States to put in place robust and sustainable safety oversight systems and to progressively evolve them into more sophisticated means of managing safety. These objectives align with ICAO's requirements for the implementation of State safety programmes by States and safety management systems by service providers. The GASP suggests that international organizations work with their members to ensure congruence between SSP and SMS indicators, States need to actively engage service providers in the development of SMS SPIs.

In this context, the role of the State is evolving to include the establishment and achievement of safety performance targets as well as effective oversight of its service providers' SMS, including service provider safety investigations. The ultimate aim is to improve the safety performance of the aviation industry for the betterment of all those in the world who rely on aviation transport services.

The QantasLink case study is a poignant example of how cooperation between States and service provider can work when funds and time and resources and interest available to invest. We should take this opportunity to improve safety in States and across the world. It's not about us. It's about the travellers.

Aviation safety has made enormous gains over the past 50 years. Much of the gain can be attributed to AIIA. We are now faced with an even greater challenge. An athlete will tell you that the last little amount is the hardest to achieve. Everything that has made aviation a successful industry up until now continues to be relevant. We must remain vigilant. In addition, we have to work together to root out the last vestiges of unsafe performance. This will require unprecedented cooperation, adaptability and focus.

Many State AIIA having been performing the same – important – role for decades. To change to a new way of operating will require: commitment, implementation planning, agreed targets and objectives. In some instances, cooperation and assistance will be from other similar bodies or an implementation partner.

The future of aviation safety is bright. The future of all contributors to aviation safety is even brighter. The information age has endowed us with the tools and knowledge to achieve ICAO's vision, no fatalities. We look forward to working together to make the vision a reality.

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