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New ideas in safety management: A case study of a regional airline

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Abstract

This paper outlines a new safety information system that provides a simple method for organisations hoping to practically measure and improve their safety culture over time. INDICATE (Identifying Needed Defences In the Civil Aviation Transport Environment) is a self management safety tool which is designed to reinforce an effective company safety culture and encourage more consistent reporting of safety hazards. The INDICATE program was developed in response to a recognition, from regular public transport (RPT) and low capacity charter operators, that there are few proactive safety management programs that are simple, cost effective and reliably demonstrate improvements in aviation safety performance. The six core elements of the INDICATE program are outlined, which are based upon the concept of building better safety defences within an operator and the wider aviation industry. The successful results of a trial within a major Australian regional airline are also presented. Findings indicated that the program can have a positive influence on an operators safety culture, specifically improving the way safety information is communicated, distributed and managed. Recent applications of the program to the wider aviation community is discussed.

Introduction

> *A true safety culture is one which recognises that not to have any accidents must always be followed up by the word "YET"* (Hudson, 1997, p. 7).

The safety standard of Australia's regional airlines[1] has received considerable attention as a result of a small number of recent and highly publicised fatal accidents. For example, the crash of VH-NDU, a Piper PA31-350 Navajo Chieftain aircraft at Young, New South Wales (BASI, 1994a). The VH-NDU accident, and other recent fatal accidents within the low capacity passenger carrying sector, have consistently demonstrated that the greatest source of variance in operating safety is not necessarily aircraft equipment or the category of operation, but the real cost comes from the **safety culture** of organisations within the aviation system. In other words, organisations that have accidents are often accused of failing to foster an effective safety culture.

The title of this years *Safeskies* conference, "Setting the right aviation safety culture", and recent papers on the subject (Reason, 1997; Hudson, 1997; Ginnett, 1997) suggest that the establishment of a good safety culture will encourage safe behaviour and minimise the risk of having an accident. However, there are few guidelines available to organisations that hope to practically measure and improve their safety culture. This study set out to provide operators of regular public transport (rpt) aircraft, with a simple method to:

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[1] Regional airlines are defined as airlines operating regular public transport (RPT) aircraft with a capacity to carry 38 passengers or less.

- measure their organisational safety culture,
- implement strategies to improve their safety culture, and
- regularly monitor any measurable changes in safety culture over time.

The present study initially focused on regional airlines and low capacity aircraft charter operators since this section of the industry, compared to high capacity operators, is constrained by:

- less expertise and knowledge of system safety,
- less resources and expertise available for aircraft maintenance,
- an extremely competitive operating environment, and
- fewer resources available for crew/staff training.

In addition, it was imperative to educate small aviation companies, which typically operate on limited budgets, that they do not have to spend large amounts of money to improve their company safety culture. Measurable safety improvements are achievable if an operator is aware of the hazards of its operation and acts to ensure that adequate safety defences are in place.

To monitor and improve safety culture over time, a proactive safety management program called INDICATE was developed. This paper outlines the development of INDICATE, its practical implementation and evaluation within Kendell Airlines and its application within the wider industry. The INDICATE program is one method in which the Bureau of Air Safety Investigation (BASI), in consultation with the industry, is endeavouring to encourage more proactive safety management practices within the low capacity passenger carrying sector.

The development of INDICATE

While there is a great deal of published material on the subject of safety management, most of this material identifies the essential elements that make up a typical safety program. However, few authors provide a simple methodology to implement these essential elements and evaluate whether they are working. Discussions with various Australian regional airlines revealed that there is sufficient motivation to adopt a proactive safety program but operators lacked a structured process to follow (Edkins, 1997; Edkins & Brown, 1996).

It is possible to identify the common elements that make up an "ideal" safety program. These activities are designed to achieve the following desirable outcomes:

- senior management commitment to safety,
- the continual identification and correction of safety hazards within the company,
- staff who are actively involved in company safety management,
- the provision of current information on the safety health of the organisation,
- staff that are motivated to be more safety conscious, and
- more open communication between different departments, and between management and staff, so those that need safety information have access to it.

The six core activities of the INDICATE program are structured processes which provide a simple methodology in which to achieve these outcomes. A checklist for implementing the core activities of the INDICATE program is provided in Figure 1. Detailed step by step guidelines for implementing the

INDICATE program can be found in the BASI (1997) report ***"A system to proactively monitor airline safety performance: The BASI-INDICATE program. Implementation guide".***

1. APPOINTING AN OPERATIONAL SAFETY MANAGER

* **what criteria will be used to appoint the safety manager?**
* **how much authority will the safety manager have?**
* **who will the safety manager report to?**
* **will the safety managers' position be part time or full time?**
* **will the safety manager require assistance?**

2. PROACTIVELY IDENTIFYING AIRLINE SAFETY HAZARDS

* **how many focus groups are needed?**
* **when is the best time to run the groups?**
* **will management groups be run separately from staff groups?**
* **who will act as the scribe and who will facilitate the groups?**
* **how will staff be encouraged to attend?**

3. ESTABLISHING A CONFIDENTIAL SAFETY REPORTING SYSTEM

* **how will the reporting system remain confidential?**
* **how will staff find out about the reporting system?**
* **who will the reporting forms go to and what records will be kept?**
* **how will staff use the reporting forms?**
* **who will act on the reports?**
* **how will feedback be given to the originator?**
* **how will the results of the reporting system be publicised?**
* **will anonymous reports be accepted?**
* **how will reports that are personal attacks be managed?**

4. ESTABLISHING REGULAR SAFETY MEETINGS WITH MANAGEMENT

* **who will chair and participate in the meetings?**
* **are the meetings freely open to staff to attend?**
* **how often will meetings occur?**
* **what records will be kept and where will the results of the meetings be sent?**

5. MAINTAINING A SAFETY INFORMATION DATABASE

* **is a computer or paper version required?**
* **what access will the user have to the computer and will the information be secure?**
* **is there a backup user trained in operating the software?**

6. ENSURING THAT VITAL SAFETY INFORMATION IS REGULARLY COMMUNICATED TO ALL STAFF

* **what are the best mediums available within the company to distribute information?**
* **how will critical and routine safety information be distributed?**
* **how will you determine whether staff are reading the information?**

Figure 1. Checklist For Implementing The INDICATE Program

In addition, the INDICATE program, through the safety information database, encourages operators to report system safety hazards to BASI. In Australia, it is a legal requirement to report air safety

incidents via an Aviation Safety Incident Report (ASIR). Despite this mandatory requirement, there is a recognised problem of under reporting which, in part, stems from a lack of awareness about what should be reported. The INDICATE program provides operators with a simple method of reporting safety deficiencies within the aviation system. Operators who use the program do so with the understanding that any reported safety deficiencies will be addressed confidentially, and feedback provided regardless of the outcome. The key advantage of the INDICATE program is that it encourages a better relationship between BASI and the operators that use the program. This affords BASI more opportunity to identify and address potential aviation safety hazards.

The Kendell Experience - Recognising The Need For INDICATE

An organisation feels it is safe until a trigger mechanism tells them it is not. Professor James Reason points out that if there are latent failures within an organisation then at some stage they will be exposed. For Kendells that exposure came with an accident to one of their SAAB 340A aircraft at Devonport, Tasmania (BASI, 1994b). This accident occurred during the process of introducing crew resource management (CRM) training to technical and cabin crew. However, an effective safety culture had not been afforded the time to develop throughout the company. What the company needed was a structure to achieve better safety. The INDICATE program provided Kendells with a framework that allowed them to construct that safety structure.

Kendell had found with CRM that if all the parties involved had the opportunity to provide input into the type and method of training delivered, the system itself seemed to work more smoothly. Similarly, INDICATE is based on the concept that safety is *"everybody's responsibility"*. Therefore, the program provided Kendell with a method to encourage all company staff to be safety-oriented and to accept responsibility for the airlines' safety health.

The evaluation of INDICATE

An eight month trial of INDICATE commenced with Kendell Airlines in July 1995. The airline operates from three main bases in Melbourne, Adelaide and Sydney. The INDICATE program was implemented in the Sydney and Adelaide bases (81 staff) while the Melbourne base (72 staff) was used as a control group, to measure any changes in safety culture during the trial period.

The program was implemented by requesting staff, within the Sydney-Adelaide bases, to participate in a series of focus groups which required them to identify hazards which had the potential to affect the safety of passengers carried by the airline. The time and cost involved for Kendell in gathering this information was minimal, being only the time of the staff involved in the focus groups. A total of twelve groups were conducted which, on average, met for one and a half hours each.

Airline safety culture was measured in each base using the (ASCI) Airline Safety Culture Index (Edkins & Coakes, 1997). The ASCI was developed based on ICAO's (1992) notion of the attributes that make up a good safety culture, which are:

- senior management placing a strong emphasis on safety,
- staff having an understanding of hazards within the workplace,
- senior managements' willingness to accept criticism and an openness to opposing views,
- senior management fostering a climate that encourages feedback,
- emphasising the importance of communicating relevant safety information,
- the promotion of realistic and workable safety rules, and

- ensuring staff are well educated and trained so that they understand the consequences of unsafe acts.

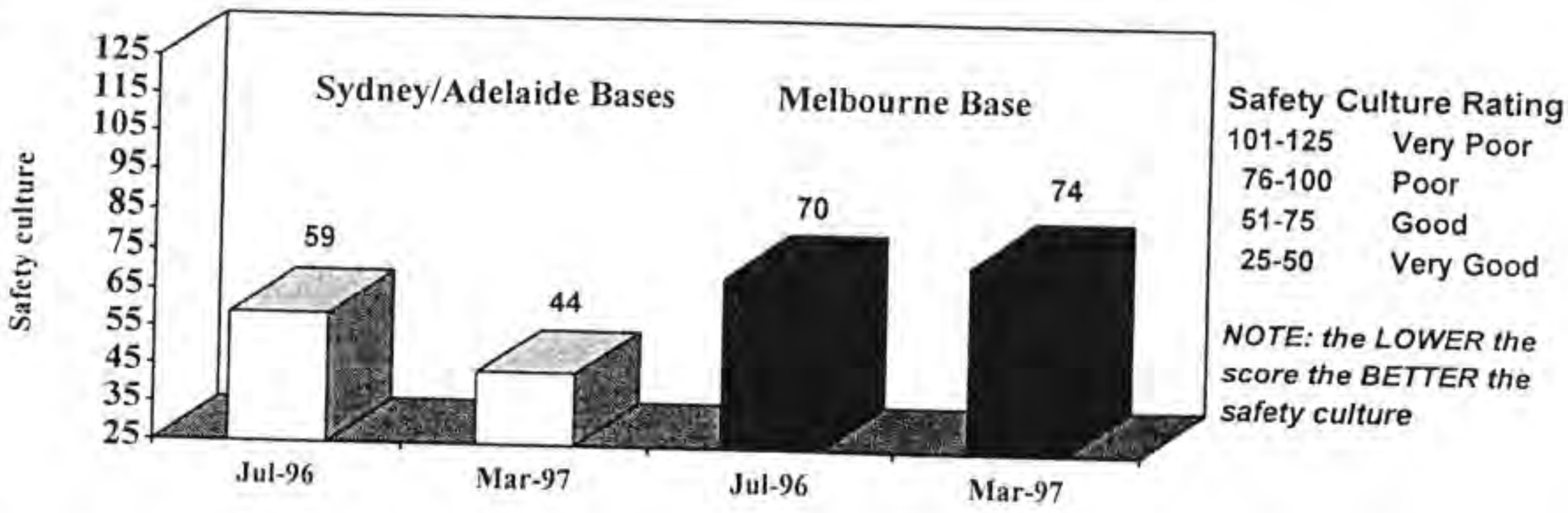
The ASCI was administered prior to the implementation of INDICATE and again at the end of the eight month trial period. Cronbach's alpha reliability analysis conducted on the questionnaire items indicated that the overall scale was equal to .9350 at the start of the trial and .9647 at the end of the trial. In addition, each base was given a confidential critical incident reporting system, which provided staff with a simple means of reporting perceived safety problems.

The INDICATE program is a proactive safety information system that reinforces an *informed culture* - one in which managers and staff have current knowledge about the factors that determine the safety of the system as a whole. It is also a program that encourages a *reporting culture* - one in which people are prepared to report safety hazards. Therefore, it was expected that at the end of the trial period staff within the Sydney-Adelaide bases would show an improvement in safety culture, as measured by the ASCI, and would submit more safety reporting forms compared to the Melbourne base.

Results of the Kendell trial

Mean safety culture scores for the Sydney-Adelaide and Melbourne bases are presented below at both the start (July 1996) and finish (March 1997) of the eight month trial period.

Figure 1. Airline safety culture



The scores reveal that staff generally perceived that safety was well managed. In July 1996 the Sydney-Adelaide bases showed a better safety culture score in comparison to the Melbourne base. However, in March 1997, following the implementation of the INDICATE program, the Sydney-Adelaide bases had demonstrated a significant improvement in their mean safety culture score, while the Melbourne base indicated a poorer safety culture.[2] Airline staff within the Sydney-Adelaide bases revealed that they were more positive in the following areas:

- provision of safety training to new staff,
- management praise for safe working,
- better company feedback regarding safety performance, and
- more frequent safety audits.

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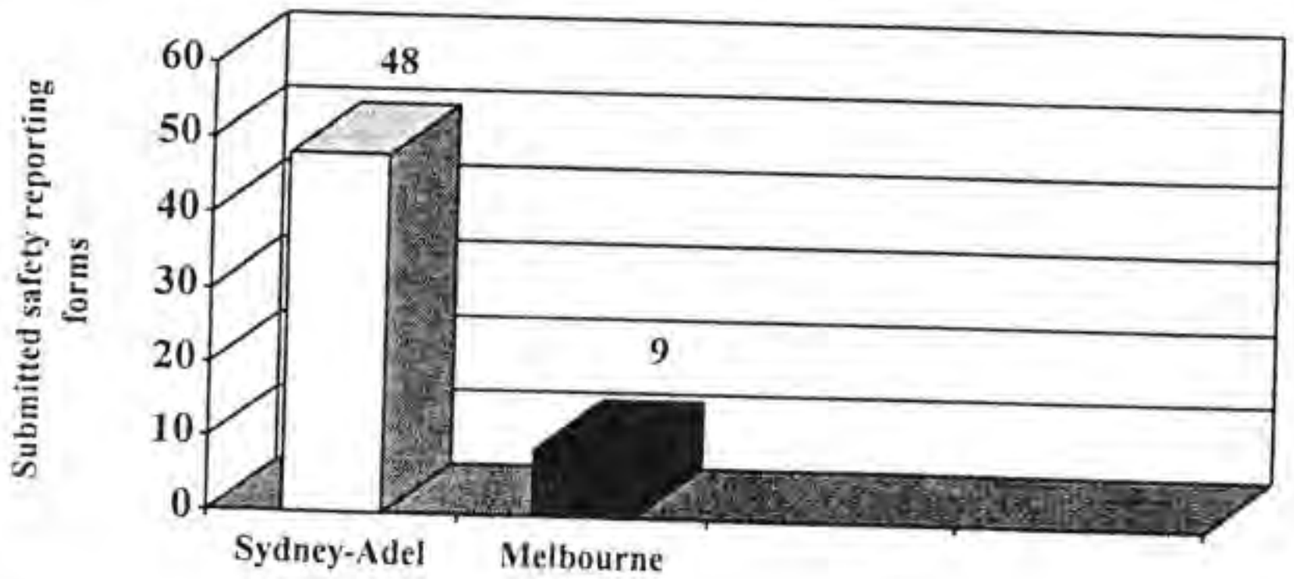
[2] A repeated measures Analysis of Variance (ANOVA) was performed on the data and revealed that this difference is statistically significant $F(1, 148) = 109.05$, $p < .001$.

Staff in the Melbourne base showed a more negative attitude with regard to the following:

- inadequate procedures to follow in the event of an emergency,
- lack of employee effort in preventing accidents,
- managers failing to recognise when employees are working unsafely, and
- inadequate company actions taken to reduce accident recurrence.

The total number of safety reporting forms submitted for both bases is shown below. These results indicate that the Sydney-Adelaide bases submitted more than five times as many reports as the Melbourne base. This difference may be a direct result of an attitude change within the Sydney-Adelaide bases facilitated by the implementation of the safety program. For example, a more positive attitude to reporting safety issues, increased staff confidence in safety problems being addressed, more awareness amongst staff of operational hazards and improved staff commitment to improving company safety.

Figure 2 Submitted safety reporting forms



In addition to these results, a number of potential safety hazards identified by staff in the Sydney/Adelaide bases, have been addressed by the company since the implementation of the INDICATE program. These include improvements in standard operating procedures, more consistent communication between flight and ground crew and a review of emergency equipment needs within the airline.

Several safety issues that reflected wider hazards within the aviation industry were also brought to the attention of BASI. These include:

- better airport ground lighting in some airports serviced by the airline,
- facilitation of a review by the Civil Aviation Safety Authority to re-design impractical instrument approaches at particular airports serviced by the airline,
- more standardised procedures for carrying unaccompanied passenger baggage,
- installation of better runway approach lighting on Runway 30 at Canberra airport, and
- better illumination of some Sydney airport taxiway designator lights.

Many of the resolved safety deficiencies have been longstanding problems that only required simple solutions. The involvement of BASI in resolving these safety deficiencies has assisted the airline in

improving safety standards in areas where, historically, they have had limited progress. In addition, some of the safety deficiencies that have been addressed represent significant cost savings to the airline. For example, the redesign of specific instrument approaches where a low circling approach has been replaced by a runway aligned approach. This represents significant cost saving in terms of fuel and time for the airline, in addition to the recognised safety benefits.

The combined results of the Kendell study provide strong evidence that the INDICATE program has had a positive influence on safety management within the airline. The resultant action on safety hazards identified by the Sydney-Adelaide bases is a good indicator of the success of the program and reflects a positive safety partnership between BASI and the aviation industry. Furthermore, it is clear that implementing a structured framework to encourage better and more consistent communication within an organisation is crucial for improving company safety culture.

Further improvements in safety culture

At the completion of the trial period, Kendell management endorsed the implementation of INDICATE within the entire company to facilitate further improvements in safety culture across each base. A national coordinator for the program was formally appointed to complement the base coordinator positions in Sydney and Adelaide. In addition, the expansion of the program resulted in a coordinator for the Melbourne base being appointed and a requirement for focus groups discussions for Melbourne-based staff.

Kendell management also decided that the airline should have an identity of their own with regard to INDICATE and consequently the KAIRS name emerged - Kendell Airlines Internal Reporting System. At this point, the Chief Executive Officer used the company's Safety Newsletter to advise staff of the new arrangements for KAIRS. These included the appointment of a National Coordinator and the revamping of a Safety Committee which consisted of:

- Chief Executive Officer,
- Chief Pilot - Director of Flying Operations,
- Assistant Chief Pilot,
- Director of Engineering,
- Quality Assurance Manager - Engineering,
- National KAIRS Coordinator, and
- Company Secretary

The Benefits Of INDICATE

The INDICATE program allows an operator to address safety issues at both a local and national level. Those problems which are felt to require the involvement of BASI, the Civil Aviation Safety Authority, Airservices, and other organisations external to the operator, are forwarded to the INDICATE program and then assigned to various areas by BASI. This procedure gives the operator a direct link to BASI and a voice to the rest of the aviation community. It is this vital link which has been instrumental in dispelling the old myth that BASI is the policeman. INDICATE demonstrates that BASI and the industry can jointly work at improving aviation safety culture by reinforcing a more informed culture amongst operators and encouraging more consistent safety reporting.

For Kendell, the spread of the new KAIRS system to all areas of the company means that they are able to utilise each of their 400 staff as safety officers. All work areas have the KAIRS report forms

and any employee is able to submit a report or consult a KAIRS coordinator when a safety concern arises. The Kendell experience proves that implementing a more standardised approach to safety management can translate into measurable improvements in safety culture.

Progress report: Recent applications of INDICATE

With the current policy of global harmonisation in all aspects of aviation, it would seem that initiatives such as BASI's INDICATE program are meeting the intent and purpose of the harmonisation principle. The INDICATE program was developed in response to recommendations arising from an inquiry into general aviation and in particular, fare-paying passenger operations within that environment. The program is an initiative which is compatible with the views and recommendations of other leading safety agencies such as the National Transportation Safety Board and strongly reflects the position of BASI in relation to these matters.

One of the greatest selling points of the INDICATE program is that it is autonomous. Both the control of the program and its success, or indeed its failure, is in the hands of individual aviation companies. The program assists companies to conduct a continuous process of safety self-audit to ensure that the likelihood of an accident or incident is reduced. This process, in turn, helps to ensure that external safety audits, including those of government agencies such as the Civil Aviation Safety Authority, are less likely to uncover serious safety deficiencies which may have operational and financial implications upon a company.

In addition, the program simply provides a set of guidelines and is intended to be flexible enough so that individual aviation companies may adapt and/or expand the program to suit their particular needs.

Some operators and chief pilots have been heard to say that they can't afford to implement these programs because of the financial and human resources that would be required to set up and maintain such programs. Others have been heard to say that such programs can only work in large companies that employ many staff. The following feedback from companies that represent a wide cross-section of the aviation community would appear to refute these opinions.

Medium size aviation charter company:

> *"We have been running the program for approximately six weeks. Most of this time has been used getting familiar with the activities of the program, as they will relate to our company. We have now reverted to a monthly cycle of tasks. Changes that impact positively on safety have already been implemented as a result of the program and our management are in full support of the initiative."*

Major regional airline:

> *"This program will enhance our existing safety culture by providing additional methods and management practices to enable us to proactively monitor our airline's safety occurrences. Proactive rather than reactive safety programs are particularly important considering the high social and economic costs of airline accidents to the community at large. Every employee has a vital stake in maintaining our company as a safe operating and safety conscious airline".*

Small aviation charter company:

> *"We have been using the BASI-INDICATE system now for approximately one month and find it overall a very useful and powerful tool. You may be aware that we are using it in a much broader way than you might have originally perceived, but we feel very confident that with correct training this broader use will greatly enhance our proactive approach in various areas. It has been incorporated into our ISO 9002 system as the continual improvement database."*

In addition to applications described above, the Australian aerial agricultural industry is currently in the process of adapting the program at an association level. A number of strategies intended to expand upon and add value to the basic program are being developed to address the industry's particular problems. These may include safety awareness seminars similar to the Robinson 22 courses, as well as the application of the Controlled Flight Into Terrain (CFIT) audit, adapted specifically to the aerial agricultural industry. The insurance industry fully supports the adoption of such an initiative in a sector of the aviation industry which is largely self-regulated but which historically suffers the highest accident rate of any sector of aviation in Australia.

Kendell Airlines, the subject of the initial trial of INDICATE, has continued to utilise the program effectively and has now expanded the program to all its operational centres. Whilst most safety concerns are addressed satisfactorily in-house, BASI continues to receive information about safety deficiencies identified by Kendells which may have an effect on the wider aviation community. More recently, these have included concerns about:

- bird management programs at privately owned licensed aerodromes;
- training for pilots to operate Airborne Collision Avoidance Systems (ACAS);
- instrument approach design at particular airports; and,
- Automated Weather Station (AWS) facilities.

The INDICATE software was developed as a safety information management tool in order to provide companies with a means of recording, retrieving and distributing safety related information. It has since been provided, on request and free of charge, to approximately 25 recipients. These have ranged from a variety of aviation companies including regional airlines, charter companies, helicopter operators and flying schools, to aviation consultants servicing both domestic and international companies. Feedback on the value of the software has been positive and suggestions for improvements to the software are currently being considered

Conclusion

Aviation safety is based on the foundation of laws and regulations, drafted over many years, and in many cases at the cost of lives and equipment. However, it is an unfortunate fact that despite the extraordinarily high levels of safety that now exist within the Australian aviation industry, and the plethora of rules and regulations, accidents and incidents still occur. The inevitable conclusion is that better rules and regulations are required. However, any improvement to be gained in aviation safety will require the combined efforts of government bodies, airline operators, industry groups and all individuals that have a role to play in aviation. In particular, it is imperative that if aviation company managers are serious about improving safety, they must be open to adopting the systemic ideas and

practical, proactive approaches that are outlined in this study. With a policy of safety as a priority and the fostering of open communication about safety related matters, a program such as INDICATE has demonstrated that it can be applied at any level within the aviation community.

For those operators foolish enough to think that they already possess a good safety culture, consider these words from Professor James Reason:

> *... it is worth pointing out that if you are convinced that your organisation has a good safety culture, you are almost certainly mistaken. Like a state of grace, a safety culture is something that is striven for but rarely attained. As in religion, the process is more important than the product. The virtue - and the reward - lies in the struggle rather than the outcome.(Reason, 1997, p. 7).*

The above quote suggests that to improve safety culture *it's not what you do but it's the way that you do it* which is important. This study has demonstrated that safety culture is a tangible concept that can be measured and that simple practical strategies are available to actively improve safety culture over time. It is hoped that the INDICATE implementation guide and software package, produced by BASI, will help to ensure that aviation in Australia continues to enjoy a low accident rate and encourage further safety initiatives within those areas of the industry that may be considered more vulnerable.

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