Junior Research & Application

Management of aircrew Human Factors training in Australasian airlines. By Wayne MARTIN, coordinated by Jose D. PÉREZGONZÁLEZ. Assignment submitted to paper 190.313, Advanced Aviation Human Factors, 2006.

Paper coordinator's review:

Students of 190.313 (Advance Aviation Human Factors) had alternative options for course work during 2006. Among options, they could choose to contribute to the aviation sector, in general, by carrying out research work on any aviation sector. They were advised that the resulting work could be sent for publication to a relevant journal pending on the quality of the work.

The potential candidates opting for the research strand were also advised to work in close collaboration with the paper coordinator in order to maximise their own efficiency, and to ensure an output of quality.

The assessment criteria for the course work consisted of the submission of a research work on a topic agreed with the course coordinator. As stated earlier, the student would also have the opportunity to request feedback in order to improve his work, if so wished. After the assessment of the course work, the resulting work could be prepared for submission to a journal pending on its suitability for such purpose.

Wayne Martin decided for such a research work. He described and commented upon Human Factors training in the Australasian region. Supervision was not requested by the student, and the final work was submitted for assessment at the due time.

In any case, Wayne produced a nice piece of descriptive research on the topic, covering Human Factors training carried by eight airlines operating in Australia and New Zealand. He also expanded his description to include current legislative requirements in both countries, and a discussion of best practices by ICAO and America's fifth generation Crew Resource Management.

Overall, the quality of this small research is excellent, and has prompted the consent of the student for a further assessment of his work for possible publication, pending a deeper revision of the contents and any other contributions, as appropriate. The student requested to submit a longer version of the course work for such purpose. This longer version is the one published here.

In any case, this work is presented as an example of excellent contribution to the aviation sector within 190.313 "Advance Aviation Human Factors".

Dr Jose D. Pérezgonzález
190.313 Paper coordinator

Management of Aircrew Human Factors Training in Australasian Airlines

By Wayne Martin, 190.313, Advance Aviation Human Factors

Abstract

Human factors have been prevalent in a significant number of aircraft accidents over the last hundred years. As aircraft themselves have become increasingly reliable, the spotlight has fallen on human factors as principal causes of airline accidents in the last few decades.

From the late 1970's onwards, airlines around the world have developed human factors training programmes which seek to improve, amongst other things, crew resource management. In Australasia, human factors training occurs at most airlines, but in quite differing formats. It is accepted by the vast majority of crews, managers and regulators as being beneficial to safety and is evolving all the time.

This paper will examine some Australasian airline HF/CRM programmes and current research on the best type of training which will increase aviation safety for the future.

Introduction

As early as the Second World War, it was recognized that the limiting factor in the development and design of airplanes was the ability of the human to effectively operate and manage the resources provided. (HPTI, 2006).

In the 1950's, 1960's and 1970's especially, the jet age brought with it an increase in aircraft speed, size and complexity and while aircraft engines, airframes and systems became much more reliable, and even automated, the number of aircraft accidents continued to rise. It became increasingly obvious that a large proportion of these accidents was in fact due to poor performance by the Pilots in the way that they operated their aircraft. Shortfalls in communication, leadership, situational awareness and error

management were commonly cited, along with other human factors as principal causes in most accidents.

By the mid 1970's ICAO (the International Civil Aviation Organisation), along with a number of airlines and aircraft manufacturers around the world, started to become alarmed at the increasing predominance of human factors related deficiencies and sought to do something about it. In 1975 the ICAO annual conference was predominantly devoted to human factors, with a view to analysing what was going wrong and what they could do about it.

As a result of this, a number of airlines started introducing human factors training for their pilots. Firstly KLM Royal Dutch Airlines in Holland introduced its "KHUFAC" (KLM Human Factors) course (BASI, 1998), followed by United Airlines with their "Cockpit Resource Management" course (Helmreich et al, 1999).

Since then, most of the western world's airlines have introduced CRM or human factors programmes of their own. Airline management and Aviation Authorities alike have recognized the need for improved human factors training and embraced it with improved safety cultures, training programmes and even legislation.

This paper will seek to analyse what current practices are in Human Factor training across a broad spectrum of Australasian airlines. It will also examine the regulatory requirements in New Zealand and Australia and where changes are brewing there. An analysis of CRM training will be examined and finally some recommendations will be presented for the most effective CRM training techniques.

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An analysis of current HF/CRM training in some of the major New Zealand and Australian airlines.

A number of airlines were surveyed throughout Australasia. Where possible, actual CRM facilitators, developers or co-ordinators were interviewed.

Managers, and where the opportunity arose during my research, line crews in some airlines, were also interviewed with a view to examining management and crew perceptions of CRM training.

The following results outline the CRM/HF training programmes in a number of New Zealand and Australian based airlines.

Jet Connect (Qantas New Zealand)

Jet Connect runs an in-house CRM programme.

It is developed and run by a small group of Pilots and Cabin Crew with either previous CRM or tertiary HF experience.

Training is based on a three year rotational system of six core subjects with two subjects being studied each year. Each course uses a mixture of theory, incident review and practical exercises to re-inforce each subject.

All training courses are combined for Pilots and Cabin Crew and last for half a day each year.

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Virgin Blue

Virgin Blue has a well developed CRM programme and is spending a significant amount each year on crew HF/CRM training. They regard themselves as innovative and progressive with substantial HF/CRM experience and tertiary training amongst the CRM development team. In all they have around a dozen Pilot and Cabin Crew HF Instructors. In line with current ICAO / European thinking (O'Connor et al, 2002), they have recently re-named their CRM training programme to Non-Technical Skills training.

All recurrent training courses are combined for Pilots and Cabin Crew and last for a full day each year. Pilot Induction CRM training currently lasts for three full days and will go to four days next year to ensure that new Pilots get to observe all of the previous years' courses in full.

Recurrent training is based on a four year rotational system of twelve core subjects with three subjects being studied each year. Those subjects include:

Communication
Leadership
Situational Awareness
Information Acquisition and Processing
Workload Management
Decision Making
Stress and Stress Management
Fatigue and Vigilance
Threat and Error Management
Cultural Factors
Human Error and Reliability
Automation

Each course uses a mixture of theory, incident review and practical exercises to re-inforce each subject.

Over the last two years, Virgin has also developed a Company Resource Management programme, where engineers, baggage loaders, admin staff and management participate in a HF programme designed to improve CRM across the whole company, not just within the confines of the aircraft.

Pacific Blue

Pacific Blue, as a subsidiary of Virgin Blue uses the Virgin Blue CRM programme, although they have development input and license to modify the course to meet their own requirements.

In all they have seven Pilot and Cabin Crew HF Instructors, several with previous CRM and/or tertiary HF training.

All training courses are combined for Pilots and Cabin Crew and last for a full day each year.

In line with Virgin's policy, they have recently re-named their CRM training programme to Non-Technical Skills training.

Training is based on a four year rotational system of twelve core subjects with three subjects being studied each year.

Each course uses a mixture of theory, incident review and practical exercises to re-inforce each subject.

Air New Zealand

Air New Zealand has a well developed CRM programme with two full time co-ordinators and approximately twenty Instructors.

They run a joint Pilot and Cabin Crew programme which is principally based on a human factors review of specific incidents within the group and from overseas. They use data from LOSA (Line Oriented Safety Audits) and other auditing processes to pinpoint areas which could be enhanced with further HF training and package this into a skills and awareness based training package.

"LOSA's seek to measure crew performance in the cockpit to try and identify events and actions which occur under normal operating conditions, and which could form part of a chain of events which could lead to an accident" (Harris, 2003).

Aside from an active line CRM training system, Air New Zealand crews receive three hours of HF theory training annually.

Jetstar

Jetstar runs an in-house CRM programme which was originally developed by Eastern Airlines, a Qantas subsidiary in Australia.

It is run by a group of CRM presenters within each base and is described as a "generic' package which suits both Pilots and Cabin Crew. From time to time non- flying staff are included for Company Resource Management training.

Jetstar has a two day Induction CRM programme based around a core of ten HF subjects which stem in origin from Qantas.

A one day recurrent CRM course is run every two years and all training is combined for both Pilots and Cabin Crew.

Jetstar uses its simulator and line training process for CRM development and CRM is assessed on both Simulator and Line Checks.

All training courses are combined for Pilots and Cabin Crew and last for a full day each year.

Air New Zealand Link (Air Nelson)

Air Nelson runs an in-house CRM development and training programme. It is developed and run by two Pilots.

During Induction training both Pilots and Cabin Attendants spend two days covering six core subjects including:

Communication
Judgement
Situational Awareness
Leadership
Threat and Error Management
Decision Making

Refresher training is carried out at two yearly intervals thereafter, with the subjects being based on perceived problem areas from LOSA's or the simulator checking process. A review of some overseas accidents such as the Cali 757 accident and the USAF C-5 accident at Dover AFB are also used to highlight human factors issues.

Air Nelson actively seeks to include non-flying personnel on each refresher course as part of a Company Resource Management training programme. Most courses include a representative from several areas of the company including engineering, operations and administration.

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Mt Cook Airlines

Mount Cook has a relatively new CRM programme.

In year one a generic and basic introduction to joint Flight Crew and Cabin Crew CRM is undertaken with the aim of expanding on various subjects in ensuing years.

Three Pilots and three Cabin crew are involved in the Mt Cook CRM development and training programme.

Qantas

Qantas has a human factors training department which is responsible for development and running of its CRM programme.

Their induction CRM involves a generic overview plus some skill based CRM training.

Recurrent training is joint (Flight and Cabin Crew) and is based principally on a review of human factors associated with major incidents in Qantas over the previous year. Reconstructions of incidents and reinforcement of LOSA findings are the foundation of their courses, with the main focus being on skill based error management training.

Qantas has a number of facilitators as well as human factors specialists involved with their programme. Recurrent CRM lasts for three hours each year.

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Current legislative requirements / guidelines in Australia and New Zealand

The Australian regulatory system is in a state of transition. The Civil Aviation Safety Authority (CASA) is currently moving towards a rules system which is more in keeping with the American Federal Aviation Regulations (FAR's). Current Civil Aviation Orders and Civil Aviation Regulations are slowly being replaced by Civil Aviation Safety Regulations, which in a lot of cases are numbered and follow a similar format to the USA's FAR's, an example being CASR Part 121 which will specify rules appropriate to the operation of large aircraft.

The New Zealand Civil Aviation Authority has been steadily updating its rules system over the last decade or so and now have a rules structure which also follows the American FAR system closely.

The following information was received from Peter Robbins of CASA regarding mandated CRM training in Australia:

"Current Australian legislation doesn't mandate CRM training but future legislation will for both flight and cabin crew members. A draft of the future requirements, which will be accompanied by an AC are still under development, however, it is anticipated that a CAAP relating to CRM (CAAP 217-1), which will be a precursor to the AC (note: CAAPs relate to current CARs and ACs to CASRs), will appear on our web site later this month to assist those operators who wish to plan for the implementation of Part 121 ahead of time. Also, many operators currently conduct CRM training in some form.

The following is the current draft of CASR Part 121.943 which outlines the proposed rule covering Flight Crew CRM training.

"121.943 CRM training

(1) An operator must establish procedures, in accordance with subregulation (3), to carry out flight crew CRM training, including:

(a) the CRM competencies that must be demonstrated by flight crew members undertaking the training; and

(b) the content, method of delivery and method of assessment of the training.

(2) The operator must, for the training, use trainers, course designers and examiners who are appropriately qualified.

(3) The training program must include:

(a) a method of providing feedback to flight crew members about their performance during training; and

(b) a procedure by which the quality of the training is evaluated and, if necessary, improved.

(4) The operator must establish procedures to ensure that a flight crew member does not begin unsupervised line flying before he or she has completed the operator's initial CRM training.

(5) The operator must establish procedures to ensure that a flight crew member satisfactorily completes CRM training before he or she is permitted to undertake:

(a) initial, conversion, command upgrade or recurrent training; or

(b) training equivalent to the training mentioned in paragraph (a).

(6) The operator must establish procedures to ensure that, when a flight crew member is carrying out a check flight (either in an aeroplane or by using a flight simulator), he or she also demonstrates CRM competency."

(CASA, 2006)

Note: CASR Part 121.1003 outlines proposed Cabin Crew CRM requirements. They are virtually identical to Flight Crew requirements and have been omitted for brevity.

In New Zealand the Civil Aviation Authority have more general requirements under Part 121:

"Part 121.917 Crew resource management requirements

(a) Each holder of an air operator certificate shall ensure each indoctrination, qualification, and continuing qualification curriculum includes—

(1) crew resource management training applicable to each position for which training is provided; and

(2) training in the use of each crew member's crew resource management skills, and evaluation of the skills and proficiency of each person being trained; and

(3) training and evaluation of each flight crew member's piloting, or other technical skills, in actual or simulated line-operating flight time.

(b) For flight crew members this training and evaluation shall be conducted in a flight training device or flight simulator."

(CAA, 2006)

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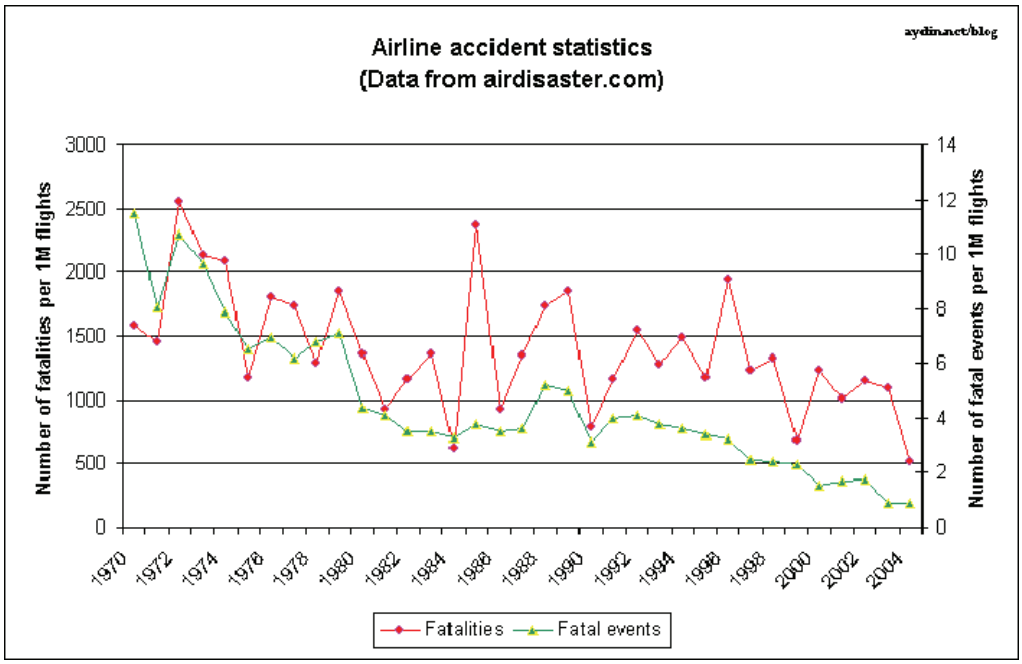
The qualitative benefits of HF/CRM training on aviation safety.

Putting a figure on the statistical improvements in aviation safety due solely to CRM is virtually impossible. Helmreich et al (1990) make the following comments:

"The outcome usually invoked as justification for CRM training is improved aviation safety, defined as a reduction in the number of accidents caused by failures in leadership, crew co-ordination, decision making, and/or human information transfer. Given this operational definition, the obvious outcome criterion is the rate of crew caused accidents, whether defined by the number of accidents occurring per hundred thousand passenger miles or by some other rate of occurrence metric.

Although the ability to relate accident rate causally to training practices would be a compelling demonstration of effectiveness, it is not an attainable goal. The overall incidence of accidents in the air transport system is very low and hence, statistical measures of rate are greatly perturbed even by single accidents." (Helmreich, et al, 1990)

The following diagram shows the overall trend in both airline accidents and airline fatalities. While the number of fatalities can be distorted, the number of fatal accidents has shown a steady decline.



(Airdisaster.com, 2006)

Orlady and Orlady (1999) also show the extent to which flight crew are the principal cause of aircraft accidents over the last four or five decades:

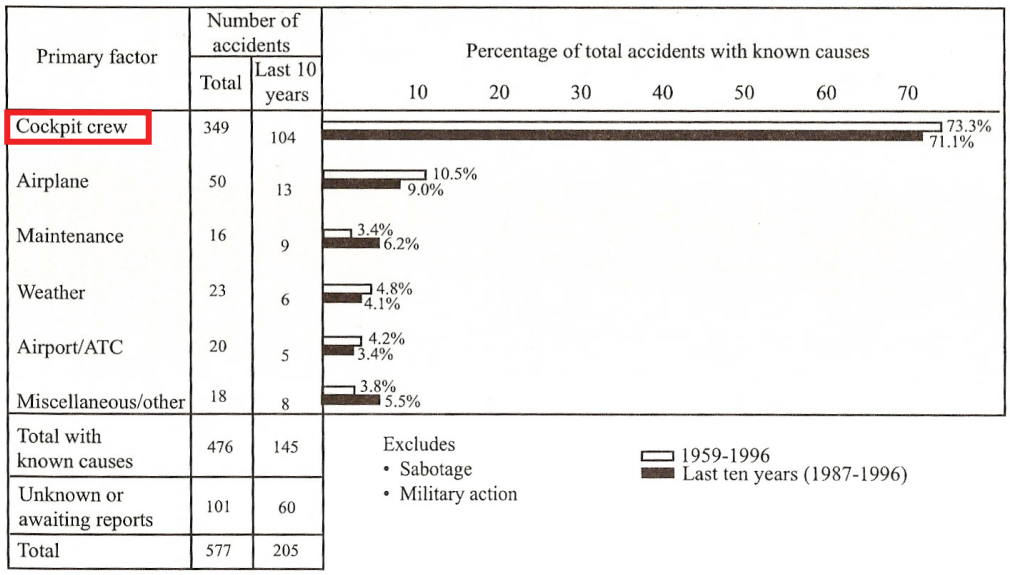


Figure 2.1 Primary Cause Factors - Worldwide Jet Hull Losses

(Orlady & Orlady, 1999).

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Perceived relevance and effectiveness of HF/CRM training by management and crews

None of the companies interviewed were willing to provide qualitative data on course feedback, however all reported anecdotal evidence of interest and perceived relevance in human factors training.

Helmreich and Wilhelm (1991) studied the effectiveness of CRM training and its perceived contribution to airline safety:

"We developed an evaluation questionnaire to be filled out by participants at the completion of initial CRM training. It solicits opinions regarding the usefulness of the training for self and others, its potential for increasing safety, and anticipated behavior change as a result of training. It also includes detailed evaluations of specific components of the training. In addition to the post seminar evaluations, attitudes regarding flightdeck management and crew coordination were assessed both before and after seminar training using a Cockpit Management Attitudes Questionnaire to determine the direction and magnitude of attitude shifts caused by the training. The CMAQ contains 25 statements describing attitudes found to be indicators of crew coordination in NASA research.

It is axiomatic that training will have more impact if participants perceive it as useful. To assess the perceived value of CRM training, questions eliciting ratings of the usefulness of the training and its potential for improving aviation safety were included on the post-seminar survey completed by all participants. The following diagram shows the distributions of responses to these items in two major airlines."

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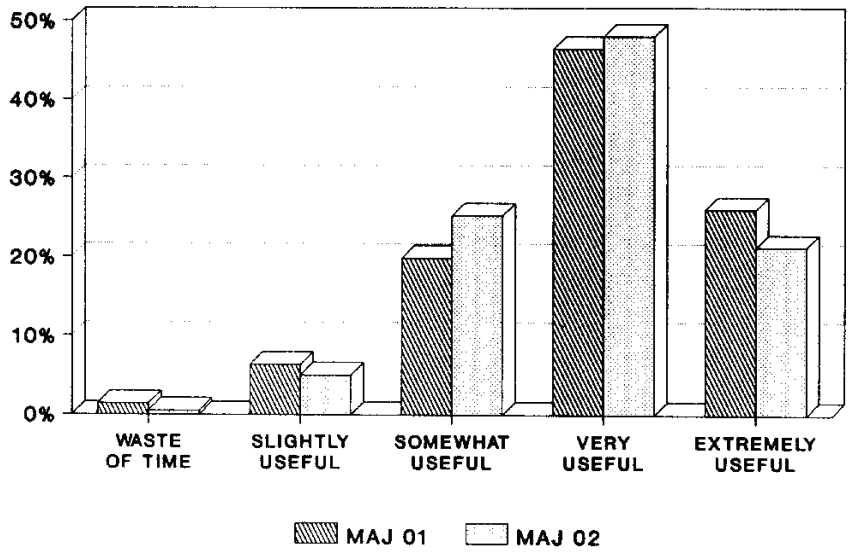

(Helmreich and Wilhelm, 1991)

The results show a strong correlation with the anecdotal evidence collected from various crews and managers throughout New Zealand and Australia, that CRM or human factors training was widely perceived as a very useful tool in accident prevention.

Interestingly, anecdotal evidence in most airlines pointed to a handful of "CRM resistant" pilots or "dinosaurs". Such people, who found the concept of CRM unnecessary or a waste of time, were often those who other crew members complained about because of poor communication skills, flight management and leadership skills. While none of the airlines surveyed would quantify or specify their examples, a story of some senior Captains getting up and walking out of a particular airline's CRM programme because it was being run by a lowly Second Officer may be indicative of a less than perfect attitude across the board.

It is widely acknowledged throughout the industry that while such individuals do exist in every airline, as time progresses and attitudes towards CRM alter, their numbers continue to decline.

Management of Aircrew Human Factors Training in Australasian Airlines

An analysis of effective and ineffective HF/CRM training techniques

Changing people's personalities may not always be possible, however it is possible to change people's attitudes. In the list of aviation human factors, some skills are innate and others are learned:

Teaching people to make structured decisions and giving them systems to do so is a relevant technique for improving decision making where time is available. Intuitive decision making is often an emotional and experience based issue and the only thing that can be improved here is an awareness that decisions made spontaneously are much more likely to be poor decisions and therefore, evaluation phases of spontaneous decisions need to be made retrospectively.

Communication can be improved through training. By highlighting the pitfalls of poor communication and by providing skill training in good communication, an awareness of the importance of good communication is developed and some positive skills for good communication can be gained.

An awareness of the effects that stress has on all other human factors including decision making, communication, information processing and leadership highlight the importance of managing stress, although no firm evidence has been shown that crews make significant lifestyle changes to reduce chronic stress levels as a result of Human factors training.

Leadership training is an area where specific skills can be learned. While some people are naturally good leaders, a lot of leadership skills are learned. By providing training in appropriate leadership styles and specific leadership skills, crews can make improvements in their leadership skills.

Workload management is another area where specific skills can be learned. Anecdotal evidence from several airlines suggests that too little time is generally apportioned to planning and prioritisation when crews are faced with managing specific tasks.

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ICAO's focus on Non-Technical Skills

ICAO was instrumental in recognising and highlighting human factors shortcomings in the majority of post world-war two airline accidents.

Since then they have been actively involved in reducing human factors related accidents in airlines around the world. They were instrumental in encouraging early CRM training programmes and have continued to develop and research management programmes for human factors. Their current focus is on development of *non-technical skills* training and assessment, a concept which has been more widely embraced in Europe than the USA and elsewhere.

"Developments in crew resource management (CRM) have progressed from the introduction of training programs to the evaluation of CRM skills, particularly for multicrew cockpits. European regulators responsible for flight operations and flight crew licensing (Joint Aviation Authorities, 1996, 1997) are introducing requirements for the training and assessment of pilots' non-technical skills" (Flin and Martin, 2001).

ICAO goes on to say:

"In the last decade, the aviation community has put considerable emphasis on non-technical skills as one of the potential sources of progress on safety. The emergence of Crew Resource Management (CRM) courses is among the most visible examples of this growing interest.

A comprehensive study which was conducted in 1997 on the practices of airlines has shown the interest for a common assessment method of soft skills, which minimizes cultural and corporate differences and maximizes implementation possibilities and effectiveness for airline instructors and examiners.

The NOTECHS framework is broken down into four primary categories: co-operation, leadership and managerial skills, situation awareness and decision making; each one being subdivided into elements and behavioural markers:

Category	Elements
1. Co-operation	- Team building and maintaining - Consideration of others - Supporting others - Conflict solving
2. Leadership and managerial skills	- Use of authority and assertiveness - Providing and maintaining standards - Planning and co-ordination - Workload management
3. Situation awareness	- Awareness of aircraft systems - Awareness of external environment - Awareness of time
4. Decision making	- Problem definition and diagnosis - Option generation - Risk assessment and option selection - Outcome review

(ICAO, 2006)

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Current American Research – Fifth Generation CRM

Recent research from the University of Texas in particular, has influenced thinking on CRM in the United States. Helmreich et al (1999) have proposed a stance whereby future CRM training should be done from a standpoint principally of error management based Crew Resource Management (EM CRM).

They discuss the progression of CRM training from its earliest days through to its current perspective and label the various stages into different generations. The following outline from their work shows the transition and development of CRM over the last two and a half decades.

First generation CRM was initiated in the U.S. by United Airlines in 1981. It was developed principally as the result of a 1979 National Aeronautics and Space Administration (NASA) workshop called *Resource Management on the Flightdeck*. The principal focus of this first generation human factors training was on improving managerial and interpersonal skills on the flight deck and as such was initially given the title of "Cockpit Resource Management".

Second generation CRM introduced a substantial expansion in CRM training focus to include crew other than Pilots. CRM shifted from Cockpit Resource Management to "Crew" Resource Management and placed much more emphasis on strategies for improving teamwork. Other developments at this stage included a more modular approach with subjects such as situational awareness, stress management and decision making being addressed as well as a first introduction to the concept of the error chain.

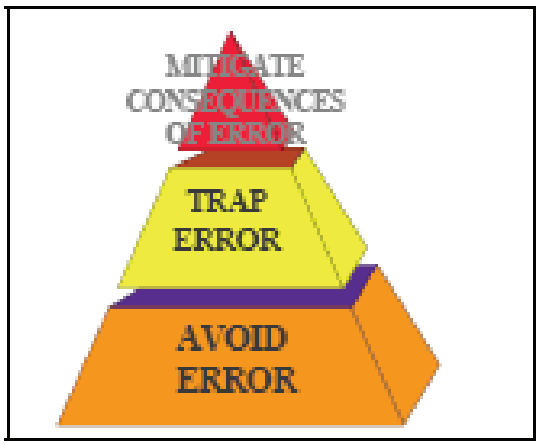
Third generation CRM which occurred during the 1990's was an expansionary process whereby CRM programmes involved maintenance personnel, Flight Dispatchers and an emphasis on combined Pilot – Flight Attendant CRM training. Another emphasis started to emerge on CRM outside the classroom, with attention being placed on CRM skills in the simulator and the aircraft during crew training and checking.

Fourth generation CRM in the U.S. developed this extended focus even further. As airlines transitioned to a more flexible training programme under an FAA scheme called *Advanced Qualification Program* (Birnbach and Longridge, 1993), they were required to incorporate CRM into all facets of their training. The use of Line Oriented Flight Training (LOFT) and Line Oriented Exercises (LOE) to train *and assess* individual and crew CRM skills became an integral part of this process. As a part of this process CRM training transitioned slightly away from the classroom to a more operational format.

Fifth generation CRM was proposed by Helmreich and Merritt (1997) with a re-emphasis on one of the original principles of CRM – that of error management. They perceived that the original reasons for first and second generation CRM training, which were principally about the management of human resources to reduce error, had been diluted somewhat.

They have proposed revisiting human error as one of the principal focuses of CRM training, while still maintaining a focus on accompanying CRM skills to achieve a more comprehensive strategy to both reduce and mitigate errors.

They have pointed out that human error is ubiquitous and inevitable and that new generations of high technology aircraft have not changed that. They proposed a three pronged attack aimed at avoiding errors, trapping them as they occur and finally in mitigating the consequences of error when they aren't trapped.



Helmreich et al (1999)

They propose that this fifth generation CRM would have as it's main aim the normalisation of error and the development of strategies for managing it. To achieve this they suggest that training at initial and recurrent levels include "*communicating the nature of cognitive errors and slips as well as empirical findings demonstrating the deleterious effects of stressors such as fatigue, work overload, and emergencies*" (Helmreich et al, 1999).

Whereas the emphasis in fourth generation CRM training had leaned away from the classroom, they have made the distinction that formal CRM instruction with an emphasis on error management and including positive examples of error detection and management should be the future direction of CRM training. This approach would be coupled with the existing operational training which has developed in fourth generation CRM programmes.

Recommendations for future HF/CRM training programmes

Most airlines in the western world have acknowledged the serious negative implications poor human factors can have across the industry. A lot of regulators and airlines have adopted a stance that improving CRM skills will improve aviation safety.

CRM or Human Factors training can occur on two levels: An awareness of human factor issues and teaching of human factors skills.

The Training Manager in today's airline has an unenviable task in maximising the training benefit available from CRM training in the time available. Airlines may appreciate the tangible benefits CRM training has on increasing safety, however they don't have unlimited resources with which to continually remove crews from the line for such training. A trade off must be made in each airline and the onus remains with each training department to ensure that the maximum benefit is delivered in whatever time is given.

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In planning a CRM programme the Training Manager should institute the following principles:

- Crews will tend to learn more if they enjoy the training. This is best achieved by using relevant examples and direct on-the-job applications. While the lessons learned from the ubiquitous "crash video" are often appreciated in a morbid way, they should not constitute the foundation for CRM training. Perhaps coupled with some theory and skill training, they will complement a training programme.
- Induction training should have a comprehensive review of all the main CRM core subjects and ideas. Because crews are not being removed from the line, the opportunity should be taken to teach the fundamentals, principles and an array of skills which they can reinforce later in recurrent training. Such training would ideally take 1-2 days.
- Recurrent training should include a recap and expansion of the core subjects, either on a rotational basis or a little bit each year. A greater knowledge of the subjects increases awareness and generates positive CRM attitudes.
- Recurrent CRM training should also include skill training. It is important that the theory element is put into practice, and exercises which develop communication, leadership and workload management skills for instance will give tangible benefits on the line.
- The prevalence of human error and its negative effects on safety should be emphasised. Positive techniques to avoid, trap and mitigate the effects of crew errors should be an underlying focus throughout all CRM training.
- Recurrent CRM training should be a joint Flight/Cabin Crew process. The interactivity between Pilots and Cabin Crew in training has positive spinoffs in team building and communication on the line.

- The time available for CRM training will vary between airlines, but most operators allocate between half and a full day of recurrent CRM training each year. This current industry practice seems a reasonable compromise.

- All LOFT training should include a CRM training and assessment programme. Feedback enables crews to improve their CRM skills in realistic situations.

Conclusion

"CRM is not and never will be the mechanism to eliminate error and assure safety in a high risk endeavor such as aviation. Error is an inevitable result of the natural limitations of human performance and the function of complex systems. CRM is one of an array of tools that organisations can use to manage error.

The safety of operations is influenced by professional, organizational, and national cultures and safety requires focusing each of these toward an organisational safety culture that deals with errors non-punitively and proactively. When CRM is viewed in the context of the aviation system, its contributions and limitations can be understood. What we do know is that the rationale for human factors training is as strong now as it was when the term CRM was first coined." (Helmreich, Merritt and Wilhelm, 1999).

A wide variance exists in the style and content of CRM training in Australasian airlines. Some have a strong emphasis on theory and others have a very practical programme. Those airlines which have a comprehensive programme incorporating theory, incident review, practical skill training and LOFT exercises demonstrate a strong commitment to CRM training and could serve as models for others.

Management of Aircrew Human Factors Training in Australasian Airlines

The Australasian aviation marketplace is a very competitive one and it is beholden on Training Managers in each airline to maximise the utilisation of their crews. It is also in the best interests of each airline to have a sound safety culture with a human factors training programme which will minimise the chances of accidents or incidents.

Managing CRM programmes to ensure they are the most effective use of training time and backing it up with a positive CRM emphasis during LOFT training should be a priority in each airline.

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Captain Mike Ford, Training and Standards Manager, Air New Zealand Link (Air Nelson)

Captain Phil Stevenson, Ex Training and Standards Manager, JetStar

Captain Murray Vincent, CRM Facilitator, Pacific Blue Airlines
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Captain Steve Ackland, Line Operations Manager, Pacific Blue Airlines

Captain Richard Wallis, CRM Facilitator, Mt Cook Airlines
Captain Mark Pitt, Line Operations Manager, Mt Cook Airlines

Ms Louise Daly, Manager Professional Development (Human Factors), Qantas Airways

Captain Peter Robbins, Civil Aviation Safety Authority, Australia

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