

# **Aviation Safety Management System**

## **Implementation Document**

**The following information is provided by the UK Flight Safety Committee for guidance purposes only in the production of a company Aviation Safety Management System. The committee does not accept any liability whatsoever for incidents arising from the use of guidance contained in this document .**

## **Introduction**

The opportunity to change the way we operate is always with us, but the vision to recognise that opportunity and more importantly to act upon it and embrace the change, requires leadership.

It would be easy to address the high profile incidents that have manifested themselves and threatened the safety of our operation and believe that we are improving flight safety. The reality is that there may be numerous potential hazards laying dormant in our procedures and working practices. The recognition of these hazards, and committing to the establishment of methods of identifying and dealing with them is the first step towards improving the Company's systemic safety.

We must examine the hazards in our systems at the planning stage, at any time there are changes to procedures and after any relevant incidents. Safety must be inherent in the design of the processes and systems we use. Safety requires board level understanding, approval and backing to be systemic.

Examples of how four of the elements, or fundamental building blocks, of an aviation safety management system can be developed are detailed in this document.

1. Developing a Positive Safety Culture.
2. A comprehensive Hazard Identification, Threat Assessment and Risk Analysis process.
3. A robust method of Incident Investigation.
4. Monitoring the Aviation Safety Management Systems we put in place.

With the adoption of these concepts throughout all departments, the Company has the potential to dramatically improve aviation safety and reduce our costs by minimising losses.

# **THREE**

## **Positive Safety Culture**

### **Measuring and improving safety culture:**

The most effective and strategic way to maintain a safe operation is to ensure that an airline has a positive safety culture. Simply put, everyone in the airline must be responsible for and consider the impact on safety of everything they do. This way of thinking must be so deep-rooted that it truly becomes a 'culture'. All decisions that are made, either by the Board, by a driver on the ramp or by an engineer working alone, must consider the implications on safety before any other consideration.

A positive safety culture must be generated from the 'top down' and relies on a high degree of trust and respect between workers and management. All workers must believe without doubt that they will be supported in any decisions made in the interests of safety and they must also believe that intentional breaches of safety that jeopardise the operation will not be tolerated.

Management must convince all employees that safety is management's prime consideration and while schedule delivery and costs are important, safety must come first.

### **What is Safety Culture?**

It is the atmosphere or "way of working" within the company that influences safe behaviour. Safety cultures consist of shared beliefs, practices and attitudes. Culture is the atmosphere created, an invisible force, which shapes behaviour. A positive safety culture is the result of:

- Management and employee attitude
- Policies and procedures
- Supervisory responsibility and accountability
- Safety planning and goals
- Actions in response to unsafe behaviour
- Employee training and motivation.
- Employee involvement or "buy in".

Safety culture should start during the hiring process. If people with the right attitude are hired their behaviour will be the cornerstone of a safety culture.

### **Defining and Developing a Positive Safety Culture**

The International Civil Aviation Organisation (ICAO) suggests that a positive safety culture is made up of the following attributes:

- Senior management placing a strong emphasis on safety
- Staff having an understanding of hazards within the workplace
- Senior management's willingness to accept criticism and an openness to opposing views
- Senior management fostering a climate that encourages feedback
- Emphasis on the importance of communicating relevant safety information
- The promotion of realistic and workable rules
- Ensuring staff are well educated and trained so that they understand the consequences of unsafe acts.

### **The Role of Management**

Senior management must be a part of, not apart from, the safety culture. Management must not look down upon the organisation and direct it by edict; rather it should influence the culture as a participating component of that culture. It is not what management say they believe but what they do about it that is noted by others in the culture. Hence, there is no point in appointing a Safety Manager if that manager is “in name only”, without the discretionary powers required to enact and enforce safety policies. If employees observe management condoning or indirectly promoting something unsafe, then they lose faith in the system. When employee groups feel that they can not trust management, they will reject with suspicion any new initiatives. The first task for management is to gain and keep the trust of their employees.

### **Proactive Approach**

With regard to safety, it is important to be proactive, rather than waiting for incidents and then reacting with ‘local’ fixes. Periodic safety audits can identify weaknesses in the system which can then be addressed. The philosophy of blame and punishment is divisive and only creates defensiveness. An integrated approach uses system-wide investigation and remedies aimed at upholding the shared value of system wide safety. To that end, the organisation needs to encourage and reward vigilance and inquiry from all its members, seeking to fix the system rather than shooting the messenger.

### **Conclusion:**

Development of a positive safety culture is considered an effective way to ensure a safe operation.

Before any improvement can be made to safety culture, a company must measure its current culture. Success or failure of any introduced safety enhancement or improvement programme will be readily apparent when safety culture is measured later. Several Government aviation agencies, such as NASA and the FAA in the USA and CASA in Australia have produced Safety Management Systems that detail methods for measuring and improving safety culture.

### **Steps in Safety Culture Enhancements:**

- To improve safety culture effectively, a plan and programme are needed. Safety culture improvement is continuous, not a one-off action.
- The steps in such a process are:
  1. Assess and detail the safety management system
  2. Analyse the existing culture
  3. Identify areas for improvement
  4. Select ways for making improvement
  5. Intervene to improve the culture
  6. Monitor and evaluate the improvement.

## **SAFETY CULTURE QUESTIONNAIRE**

A safety culture survey should be undertaken to 'benchmark' the company safety culture immediately before an Aviation Safety Management System is introduced and again, perhaps 12 months later, to measure the improvements in culture resulting from the use of the system.

The survey, using the questionnaire in this section, will reveal three major facets of the company and how it behaves.

- The difference (if any) in the way managers and workers see the culture
- Targets for resources (any 1 or 2 answers)
- A benchmark to measure any changes to procedures against a later survey.

### **Airline Safety Culture Index**

All employees of an airline, irrespective of the section in which they work, contribute to safety and are each personally responsible for ensuring a positive safety culture. The purpose of this questionnaire is to obtain your opinions about safety within the airline. It would be appreciated if you would answer all of the questions as honestly as possible. Give your own answers, not those of other employees.

You are required to give your name so we can contact you for clarification if necessary but all of your answers will be kept confidential and your reply will be de-identified.

Please complete the following section to best identify your position and job description and indicate your base.

**Name:**.....

**Phone:**.....

<b>Grade (if known):</b>
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<b>Job Title:</b>
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<b>Work Area:</b>	
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<b>BASE:</b>	
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Please send this cover sheet and the completed questionnaire forms to:

**NOTE: This form will be destroyed as soon as data is recorded in the database.**

## QUESTIONNAIRE:

**How well do you think each of the following statements applies to this airline?**

Circle the appropriate number (1 to 5) in its box against each of the 25 questions.

If you **strongly disagree** with the statement, **circle 1**.

If you **strongly agree**, **circle 5**.

If your opinion is somewhere in between these extremes, **circle 2, 3 or 4** (for **disagree**, **unsure** or **agree**).

Please respond to every question. Adding all the responses gives a safety culture score for the company which is checked against known benchmarks.

Q	STATEMENT	COMPANY RATING				
		strongly disagree			strongly agree	
1	Employees are given enough training to do their tasks safely.	1	2	3	4	5
2	Managers get personally involved in safety enhancement activities.	1	2	3	4	5
3	There are procedures to follow in the event of an emergency in my work area.	1	2	3	4	5
4	Managers often discuss safety issues with employees.	1	2	3	4	5
5	Employees do all they can to prevent accidents.	1	2	3	4	5
6	Everyone is given sufficient opportunity to make suggestions regarding safety issues.	1	2	3	4	5
7	Employees often encourage each other to work safely.	1	2	3	4	5
8	Managers are aware of the main safety problems in the workplace.	1	2	3	4	5
9	All new employees are provided with sufficient safety training before commencing work.	1	2	3	4	5
10	Managers often praise employees they see working safely.	1	2	3	4	5
11	Everyone is kept informed of any changes which may affect safety.	1	2	3	4	5
12	Employees follow safety rules almost all of the time.	1	2	3	4	5

please turn over-

Continued.

<b>Q</b>	<b>STATEMENT</b>	<b>COMPANY RATING</b>				
		<b>strongly disagree</b>		<b>strongly agree</b>		
<b>13</b>	Safety within this company is better than in other airlines.	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>
<b>14</b>	Managers do all they can to prevent accidents.	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>
<b>15</b>	Accident investigations attempt to find the real causes of accidents, rather than just blame the people involved.	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>
<b>16</b>	Managers recognise when employees are working unsafely.	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>
<b>17</b>	Any defects or hazards that are reported are rectified promptly.	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>
<b>18</b>	There are mechanisms in place in my work area for me to report safety deficiencies.	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>
<b>19</b>	Managers stop unsafe operations or activities.	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>
<b>20</b>	After an accident has occurred, appropriate actions are usually taken to reduce the chance of a reoccurrence.	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>
<b>21</b>	Everyone is given sufficient feedback regarding this company's safety performance.	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>
<b>22</b>	Managers regard safety to be a very important part of all work activities.	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>
<b>23</b>	Safety audits are carried out frequently.	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>
<b>24</b>	Safety within this company is generally well controlled.	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>
<b>25</b>	Employees usually report any dangerous work practices they see.	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>
	<b>Safety culture total:</b>					

## **Notes for Safety Managers.**

**Several separate results are obtained from a safety culture survey using this form:**

1. A 'benchmark' safety culture score that can be compared with similar companies world-wide.
2. A means of comparing the views of management with those of staff regarding the Company's safety culture.
3. A means of evaluating the results of any changes made to the company's safety management system when a follow-up survey is carried out.
4. Identification of areas of concern, indicated by "1" and "2" responses which can assist in the allocation of safety resources.
5. A means of comparing the safety culture of different departments and/or operational bases.

**The higher the value, the better the safety culture rating. Use the following as a guide only but an average company safety culture score of 93 is considered a minimum. Anything less would suggest that improvements are needed.**

- |                               |         |
|-------------------------------|---------|
| • Poor safety culture         | 25-58   |
| • Bureaucratic safety culture | 59-92   |
| • Positive safety culture     | 93-125. |

Organisations with a **poor safety culture** treat safety information in the following way:

- Information is hidden
- Messengers are shot
- Responsibility is avoided
- Dissemination is discouraged
- Failure is covered up
- New ideas are crushed

Organisations with a **bureaucratic safety culture** treat safety information in the following way:

- Information may be ignored
- Messengers are tolerated
- Responsibility is compartmentalised
- Dissemination is allowed but discouraged
- Failure leads to local repairs
- New ideas present problems

Organisations with a **positive safety culture** treat safety information in the following way:

- Information is actively sought
- Messengers are trained
- Responsibility is shared
- Dissemination is rewarded
- Failure leads to inquiries and reforms
- New ideas are welcomed



# **NINE**

## **Proactive Hazard & Risk Management**

The objective of The Hazard Identification, Threat Assessment and Risk Analysis process, is to provide the Company with a technique for early identification of the potential hazards and threats to which it is exposed. The technique should initially be applied retrospectively throughout the Company and then during the early stages, of any new venture undertaken, to provide essential information for project development decisions. By this process, safer and more efficient options can be adopted from the outset, minimising the later exposure to litigation, disruption and increased costs.

The benefits include:

- the opportunity to identify specific hazards and threats within a projects life-cycle.
- the potential to review operating philosophies at an early stage before significant financial commitments are made.
- identifying differences from the level of standardisation already established.
- enhancing the existing procedures by identifying their latent failures.
- targeting expenditure in a structured way to improve safety and efficiency.

The technique can also be used within the financial arena to concentrate expenditure in the areas designated as providing maximum benefit, in accordance with the Company philosophy and requirements. At times of expansion these requirements and priorities may be vastly different to those in recession.

### **Hazard Management Definitions**

The following terms are defined in accordance with their use throughout the Hazard Identification, Threat Assessment and Risk Analysis process described below.

#### **Hazardous Event**

Hazardous events are ones which place the normal processes of the business in jeopardy or peril, although the magnitude of that jeopardy may vary tremendously.

When analysing hazardous events it is also important to identify their initial effect, to determine whether they are isolated or whether they could lead to the occurrence of further hazards events.

#### **Threats**

Threats are circumstances or situations that could in isolation, or in combination with others, allow the occurrence of a hazardous event.

#### **Defences or Barriers**

These are controls put in place to contain the threats, in order to prevent the occurrence of a hazardous event.

### **Escalation Factors**

Escalation factors are any additional circumstances that compound the magnitude of the initial hazardous event.

### **Escalation Controls**

Like defences or barriers, escalation controls are processes or conditions that are designed to restrain or minimise the possibility of the effects of escalation factors.

### **Consequences**

The worst possible consequences of a hazardous event must always be fully assessed to ensure effective contingency measures or plans are put in place in order to return the situation to normal.

### **Contingency Plans**

Comprehensive plans must be in place, and be regularly exercised and reviewed, to ensure the consequences of a hazardous event are effectively contained and the situation returned to normal.

## **Hazard Management Process**

### **Hazard Identification**

The extent to which procedures are understood or documented within the Company's various departments varies considerably, and vastly different levels of safety awareness exist. It therefore requires some level of initial training, relevant to the departments requirements, to enable them to establish and maintain the Hazard Management Process.

The process itself is very simple to understand, but it requires the expertise of both the management and staff to complete. The Hazard Management diagram, ( Bow Tie Diagram Fig 1), gives an immediate visual concept of the process. The first step in modelling the hazard, as shown in the diagram, is to identify the hazard to be examined. This may cover a broad area or be a specific item, such as, Damage to an Aircraft Skin or the Carriage of Oxygen Generators. It may even require the consideration of more than one department.

### **Training**

Any person who is involved in an activity that could result in the occurrence of a hazardous event, or who is involved in contingency planning, must be appropriately trained. Their proficiency training must also be clearly defined, accomplished and maintained.

### **Management Systems**

Any management system should ensure that the Barriers, Escalation Controls and Contingency Plans remain effective throughout the life of an operation and that the competencies of the key personnel are continually assessed and maintained. Where a non-compliance is found during the audit of a management system, the associated hazard must be reassessed and any appropriate limitations to the operation must be put in place until such time as effective remedial actions are complete.

### Bow Tie Diagram

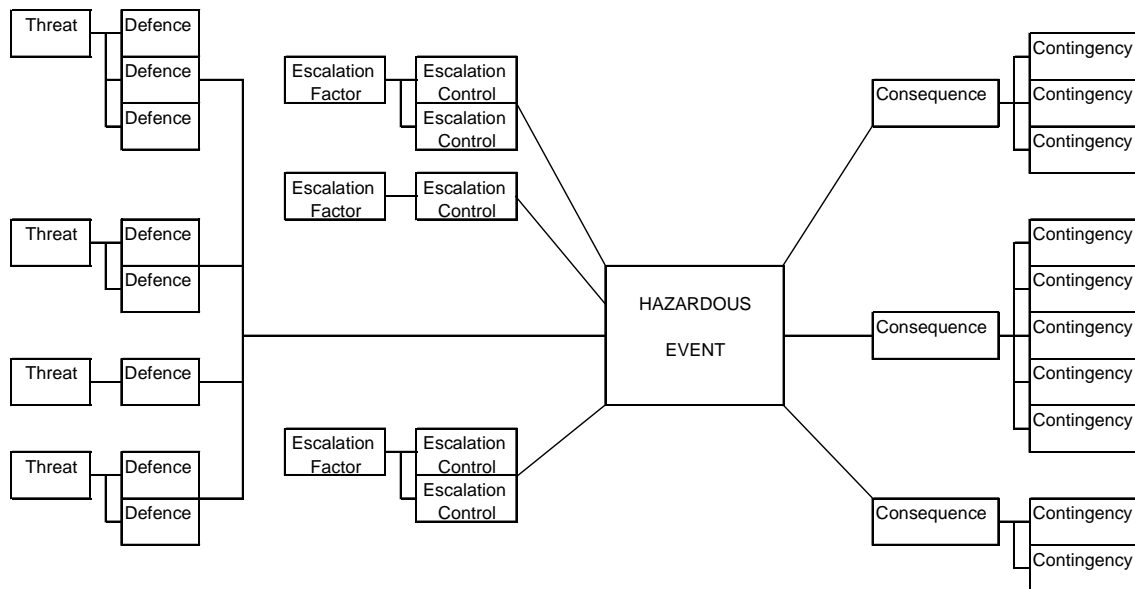


Fig 1

### **Threat Assessment**

The threats that could cause the hazardous event to occur are then listed and the defences required to contain those threats are considered.

### **Escalation**

It is then assumed that the hazardous event has just occurred and any factors that may escalate the situation are listed. Escalation controls are required to minimise the effect of the hazardous event. Obviously, there may be more than one threat or escalation factor involved with each hazard.

Having established the various possible magnitudes of the hazardous events, the consequences and associated contingency plans, to recover the situation to the normal operating status, must be considered. These may also require the co-operation of several departments.

The details should be entered into a database to assist analysis. The form shows the minimum information required to start the process.

**Hazard:**

Threat	Defence	Escalation	Control	Consequence	Contingency

## Risk Analysis

The hazardous events identified during the process will vary in terms of the risk they pose to the business, as will the threats established for each hazardous event. It is therefore possible to conduct risk analyses for both the hazards themselves and the threats that could allow them to occur.

Using the Risk Analysis Matrix, it is possible to standardise the qualitative risk assessments, and categorise the hazards and threats using the criteria the Company considers important. The matrix axes, consistent with the definition of risk, are Consequences and Probability. The consequences are ranked in increasing severity from 0 to 5 in the categories considered to be important to the Company and the probability is ranked in increasing probability from A to E.

### Risk Analysis Matrix

Severity	Consequence					Increasing Probability				
	People	On Time Dep.	Assets	Environment	Reputation	A	B	C	D	E
	P	T	A	E	R	Never heard of in the industry.	Has occurred in the industry	Has occurred in BM	Has occurred several times in the industry	Has occurred several times in BM
0	No injury	No delay	No damage	No effect	No impact	Low				
1	Slight injury	Less than 15 minutes	Slight damage	Slight effect	Slight impact					
2	Minor injury	15 to 30 minutes	Minor damage	Minor effect	Limited impact					
3	Major injury	30 to 2 Hours	Major damage	Localised effect	Considerable impact			Medium		
4	Single fatality	2 to 4 hours	extensive damage	Major effect	National impact					
5	Multiple fatalities	Over 4 hours	Massive damage	Massive effect	International impact					High

Fig 2

### Consequences

The consequences are those of credible scenarios (taking the prevailing circumstances into consideration ) that can develop from the occurrence of a hazardous event. The potential consequences, rather than the actual ones, are used. These are defined as the consequences that could have resulted from the hazard if circumstances had been less favourable.

### Probability

The probability is estimated on the basis of historical evidence or experience and whether the identified consequences have occurred within the industry or the Company.

#### Note:

1. This should not be confused with the probability that the hazard occurs: it is the probability of the estimated potential consequences occurring.
2. The consequence categories are reasonable examples, but they can be replaced with whatever the Company or department decide is important to consider in relation to their needs.

## Examples

The example Hazard Management diagram and Risk Analysis Matrix are based upon a tail scrape on landing, Fig 3. Six threats are identified and several of the required defences are common to more than one threat. One of the consequences is a hazard itself and would require to be considered separately.

The Risk Analysis Matrix places the five categories at different levels of severity and in various degrees of probability, because it relates to the probability of the estimated potential consequences occurring.

Risk Analysis Matrix

Severity	Consequence					Increasing Probability				
	People	On Time Dep.	Assets	Environment	Reputation	A	B	C	D	E
	P	T	A	E	R	Never heard of in the industry.	Has occurred in the industry	Has occurred in BM	Has occurred several times in the industry	Has occurred several times in BM
0	No injury	No delay	No damage	No effect	No impact	E	Low			
1	Slight injury	Less than 15 minutes	Slight damage	Slight effect	Slight impact		P			
2	Minor injury	15 to 30 minutes	Minor damage	Minor effect	Limited impact		R			
3	Major injury	30 to 2 Hours	Major damage	Localised effect	Considerable impact			Medium		
4	Single fatality	2 to 4 hours	extensive damage	Major effect	National impact				A	
5	Multiple fatalities	Over 4 hours	Massive damage	Massive effect	International impact				T	High

Fig. 3

The degree of severity can also be set to reflect different requirements, such as company strategy and policy, (Fig 4) or incident investigation and follow up requirements, (Fig & 5).

Company Strategy and Policy

Severity	Consequence					Increasing Probability				
	People	On Time Dep.	Assets	Environment	Reputation	A	B	C	D	E
	P	T	A	E	R	Never heard of in the industry.	Has occurred in the industry	Has occurred in BM	Has occurred several times in the industry	Has occurred several times in BM
0	No injury	No delay	No damage	No effect	No impact	Manage for continuous improvement				
1	Slight injury	Less than 15 minutes	Slight damage	Slight effect	Slight impact					
2	Minor injury	15 to 30 minutes	Minor damage	Minor effect	Limited impact					
3	Major injury	30 to 2 Hours	Major damage	Localised effect	Considerable impact	Demonstrate ALARP		Reduce risk		
4	Single fatality	2 to 4 hours	extensive damage	Major effect	National impact			Intolerable		
5	Multiple fatalities	Over 4 hours	Massive damage	Massive effect	International impact					

Fig 4.

## Incident Investigation and follow up

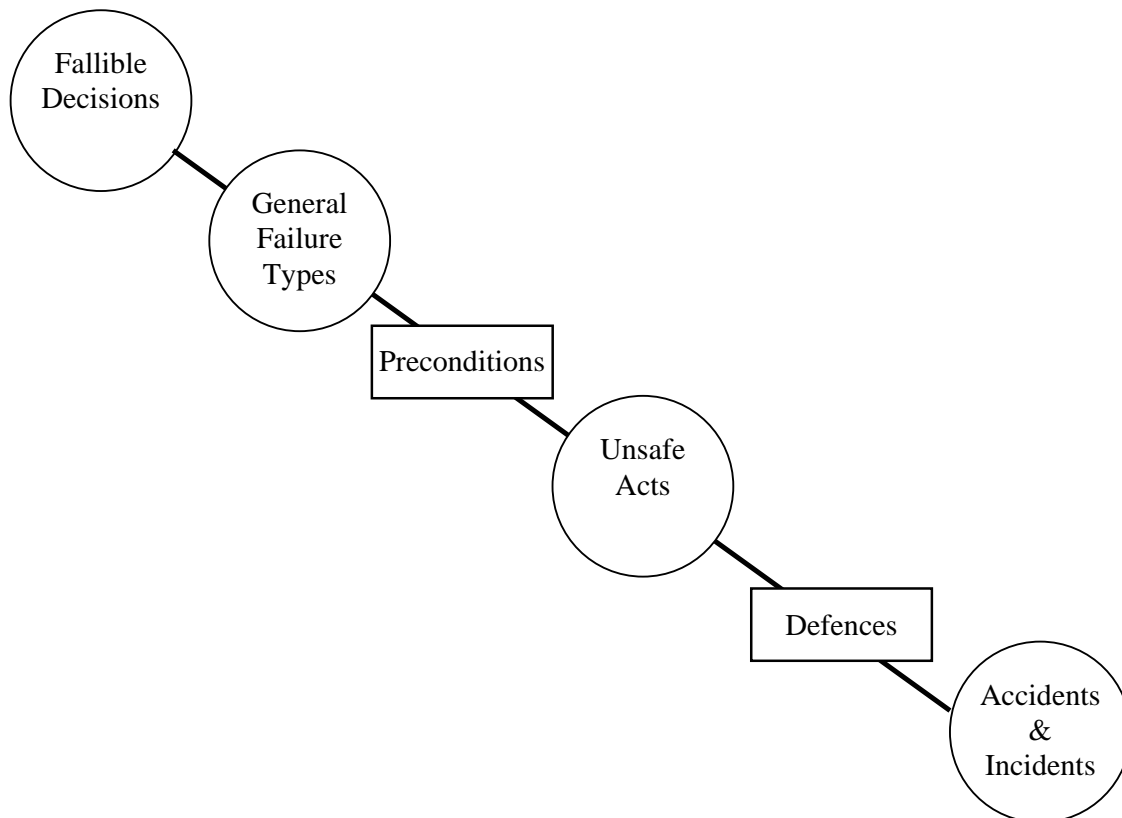
Severity	Consequence					Increasing Probability				
	People	On Time Dep.	Assets	Environment	Reputation	A	B	C	D	E
	<b>P</b>	<b>T</b>	<b>A</b>	<b>E</b>	<b>R</b>	Never heard of in the industry.	Has occurred in the industry	Has occurred in BM	Has occurred several times in the industry	Has occurred several times in BM
0	No injury	No delay	No damage	No effect	No impact	<div style="background-color: #90EE90; padding: 10px; text-align: center;">Investigate and discuss</div> <div style="background-color: #00FFFF; padding: 10px; text-align: center;">In depth analysis</div> <div style="background-color: #FF0000; padding: 10px; text-align: center;">Discussion at management level</div> <div style="background-color: #FF0000; padding: 10px; text-align: center;">In depth analysis</div> <div style="background-color: #FF0000; padding: 10px; text-align: center;">Management involvement</div>				
1	Slight injury	Less than 15 minutes	Slight damage	Slight effect	Slight impact					
2	Minor injury	15 to 30 minutes	Minor damage	Minor effect	Limited impact					
3	Major injury	30 to 2 Hours	Major damage	Localised effect	Considerable impact					
4	Single fatality	2 to 4 hours	extensive damage	Major effect	National impact					
5	Multiple fatalities	Over 4 hours	Massive damage	Massive effect	International impact					

Fig 5.

### Incident Investigation

The proposed approach to accident and incident investigation is aimed at determining the underlying causes, rather than being driven by the emotions of the outcome. It concentrates on the way the key aspects of accident causation are inherently interrelated with the accident or incident.

The concept is more concerned with strengthening the overall safety of the organisation in a proactive manner, rather than restricting the process to the individual incident under investigation.



The diagram shows the structure of the concept.



## **Investigation Definitions**

To enable the inter-linked factors to be analysed, the information derived from the investigation is classified into one of the five causation categories.

### **Breached Defences**

(The final preventative measures which failed or were missing.)

Check question: Does this item describe the situation, system, conditions, equipment or attribute which normally prevents this accident?

### **Unsafe Acts**

(The acts or omissions which led to the incident.)

Check question: Does this item tell you about an error or violation of a standard or procedure made in the presence of a hazard?

### **Preconditions**

(The state of mind or the state of the system which allowed the unsafe act.)

Check question: Does this item describe something about the working situation, social environment or a person's thought process, which influenced him to act in a certain way?

### **General Failure Types -GFT**

(The underlying Latent Failures which led to the precondition.)

Check question: Does this item identify a standard GFT present before the accident and which resulted in the Precondition?

### **Fallible Decisions**

(The decisions which created the latent failures.)

Check question: Does this item explain a management decision process which contributed to the General Failure Type?

## **Investigation Process**

The immediate precursor of an accident, whether fatal or not, is the unsafe act performed in the environment of a hazardous situation. Whilst there may be a large number of unsafe acts, only a relatively small number of them will result in accidents or incidents, because of the high level of defences the organisation already puts in place. An even smaller number will end in fatalities, substantial material loss, damage to our reputation or have an impact on the environment.

The core of this safety concept is that accidents have their primary origins in both latent and active human failure. Active failures have been introduced as unsafe acts committed at the *sharp end* of the organisation and can cause immediate adverse effects.

Conversely, latent failures stem from the decisions or actions emanating from other parts of the organisation. Their potential for producing accidents may lie dormant for a long period of time, only becoming evident when they combine with local triggering factors to breach the system's defences.

Their defining characteristic is that they were present within the organisation well before the onset of a recognisable accident sequence. In some cases their history may stretch back several years. These latent failures may be categorised as General Failure Types, GFT.

## **The Safety Benefit**

The multitude of inter-linked factors resulting in an accident or incident can be viewed from two perspectives. The most obvious is from the incident itself, in the form of an investigation; the other is from the structure of the organisation. Since we usually concentrate our interest on the factors resulting from a particular incident, we do not automatically conduct any further hazard analysis to reveal other latent failures in similar or related areas.

The major safety benefit from an investigation can be derived by examining the systems and processes akin to those that have been breached or revealed as having latently failed and also to communicate the findings laterally throughout the organisation to allow other departments to do the same. By re-examining the Hazard Management Process it should be possible to minimise the possibility of further occurrences and may lead to the identification of other weaknesses.

The investigation process is the same as any other in the way information is initially gathered, but it is the method of classification, detailed previously, that is different. Once the details surrounding an incident have been gathered, they are assembled into an incident tree, under the causation categories. (See the example). This should be done at an early stage of the investigation, to enable the tree to be used as a tool to assist in identifying where there are gaps in the information. By linking the associated events and identifying the gaps, it is possible to create a logical approach to the analysis. The gaps in the tree become questions that must be asked or information that must be pursued.

The tail strike example, on the next two pages, clarifies the fact that there are three different incidents involved in the investigation, not just the obvious one. By examining the latent failures and breached defences it is possible to construct recommendations that will not only be relevant to this incident, but will reduce the risks in other areas.

### **Note:**

The next two pages should be placed side-by-side with the six categories at the top.

Fallible  
Decisions

Latent  
Failures

Pre-conceived  
Conditions

Thrust requirement of stabilised approach omitted in error.

Stabilised approach not fully documented.

Crew perceived that thrust was applied from about 1000 feet.

High workload due to late gear selection.

Raised in training but not covered in recurrent training.

Lack of awareness of pitch limit for landing.

No history of tail scrape on landing in Company.

Covered in FCTM but not considered for inclusion in the Flying Manual.

Flying Manual does not detail the pitch limit for landing.

Crew perception is that 10 degrees is acceptable on landing as it is on T/O.

Not considered necessary for amendment service.

Flight crew training manual issued to crew on conversion but not amended.

Assumption that all crews are aware of training manual content.

Mindset of Captain to counteract pitch down on selection of reverse thrust.

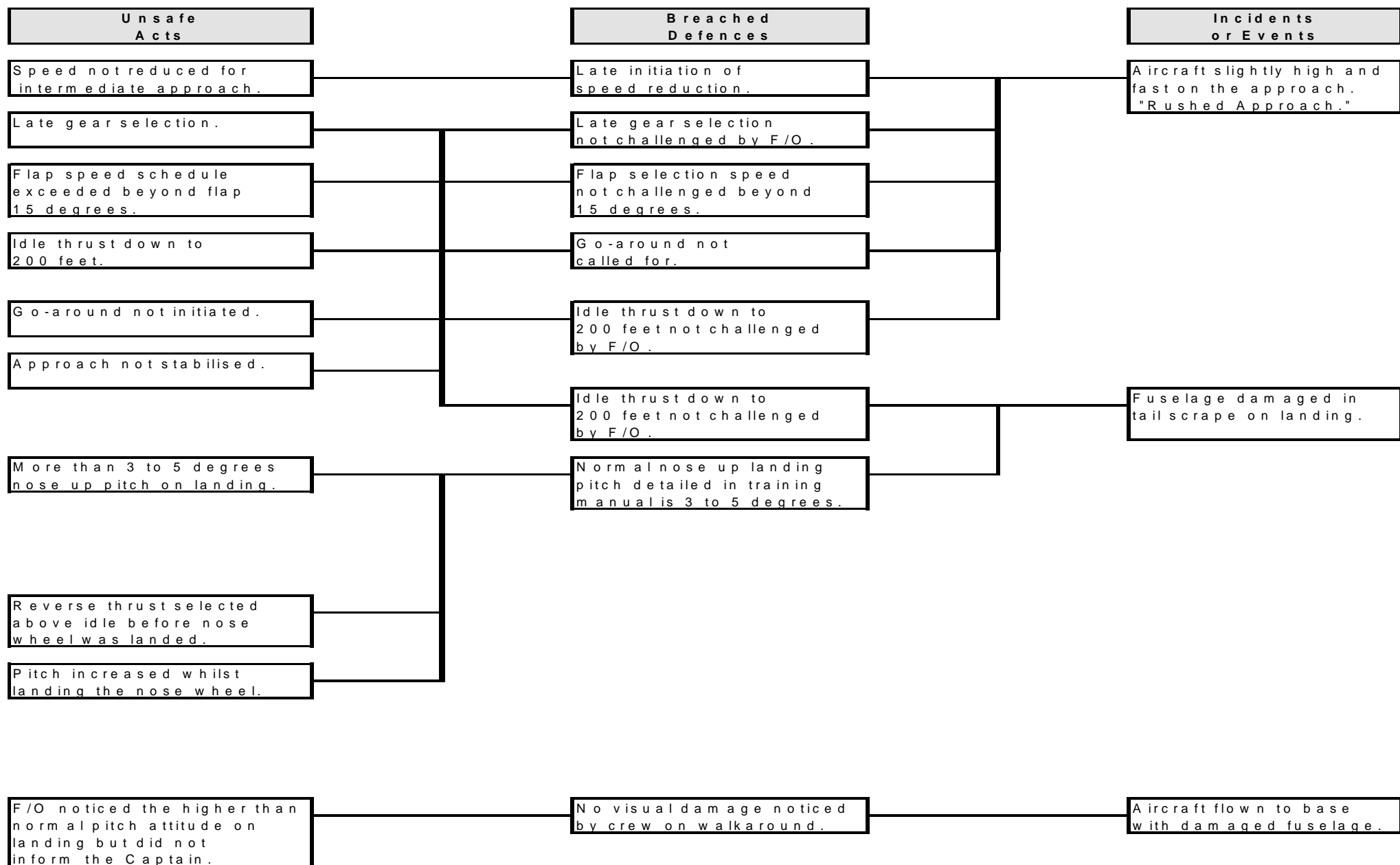
Not previously considered.

Training syllabus does not cover the need to inspect the fuselage if 10 degrees pitch is achieved on landing.

Tail bumper not damaged during tail scrape.

Variable crew factor.

Poor CRM environment.



# **FOURTEEN     Safety Management System Monitoring**

## **Implementation and Evaluation Checklist**

The key elements of a safety management system can be measured and the attached checklist will assist in identifying areas (questions answered 'NO') that must be addressed.

A survey should be undertaken to 'benchmark' the company immediately before an Aviation Safety Management System is introduced and again, perhaps 12 months later, to measure the improvements in aviation safety resulting from the use of the system.

		FACTOR	Company Response	
MANAGEMENT	1	Is senior management committed to the Aviation Safety Management Programme?	YES	NO
	2	Is there a written aviation safety policy, signed by the CEO?	YES	NO
	3	Has a Safety Manager been appointed?	YES	NO
	4	Is the safety reporting chain appropriate?	YES	NO
	5	Is the Safety Manager sufficiently supported within the organisation?	YES	NO
	6	Is there a Safety Committee?	YES	NO
	7	Is the Safety Manager credible?	YES	NO
	8	Is the Safety Manager an enthusiast for his or her job?	YES	NO
	9	Are the roles and responsibilities of the personnel in the Aviation Safety Management System documented?	YES	NO
	10	Are the values of management identified as being safety oriented?	YES	NO
	11	Are sufficient resources (financial, human, hardware) made available for the Aviation Safety Management System?	YES	NO
	12	Are there appropriate safeguards in place to ensure that the Aviation Safety Management System itself is properly evaluated?	YES	NO
	13	Have appropriate standards been documented?	YES	NO
	14	Is there an appropriate Emergency Response Plan?	YES	NO

<b>HAZARD ASSESSMENT PROCEDURES</b>	15	Is there an effective ongoing hazard identification program?	YES	NO
	16	Does the hazard identification program include a confidential reporting system?	YES	NO
	17	Are confidential reports properly de-identified?	YES	NO
	18	Are hazards associated with contracted agencies included in the Hazard Reporting System?	YES	NO
	19	Is there a procedure established for acknowledging safety-related reports?	YES	NO
	20	Is there a process whereby the hazards are continuously assessed for their risk potential (likelihood and severity)?	YES	NO
	21	Are the defences against the hazards identified?	YES	NO
	22	Does the process include the identification of the need for further defences or for hazard avoidance?	YES	NO
<b>COMMUNICATION WITH MANAGEMENT</b>	23	Is there an effective mechanism by which the Safety Manager or the Safety Committee reports to the CEO and can make recommendations for change or action?	YES	NO
	24	Is there an obligation on the part of the CEO to give formal response to any safety-related recommendations?	YES	NO
	25	In the event that the CEO makes an unfavourable response to a safety recommendation, is there a procedure whereby the matter is monitored by the Safety Manager or Safety Committee until a resolution is reached?	YES	NO
<b>FEEDBACK</b>	26	Are the results of hazard reports and safety suggestions made available to the initiator?	YES	NO
	27	Are the results of hazard reports and safety suggestions made widely available within the Company?	YES	NO
<b>DOCUMENTATION</b>	28	Is the process for risk assessment and management fully documented?	YES	NO
	29	Does the Aviation Safety Management System require the recording of identified hazards and defences?	YES	NO

<b>SAFETY-RELATED LITERATURE, COURSES AND SEMINARS</b>	30	Is there a supply of safety-related literature (eg periodicals, magazines, books, articles, posters, videos) readily available to all employees who have safety responsibilities?	YES	NO
	31	Are employees encouraged and assisted in attending training courses and seminars related to safety?	YES	NO
	32	Are employees trained in the procedures and policy of the Aviation Safety Management System?	YES	NO
<b>SAFETY INDUCTION and CONTINUOUS TRAINING</b>	33	Are new employees given sufficient training and checking in their technical duties prior to being permitted to operate either supervised or unsupervised?	YES	NO
	34	Is the continuation of training and checking of all employees adequate?	YES	NO
	35	Are employees given sufficient training in new procedures?	YES	NO
	36	Are trainers and checkers adequately trained and checked, both for competence and standardisation?	YES	NO