



CREW RESOURCE MANAGEMENT - CRM

COURSE OUTLINES

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COURSE START

LEGAL CAUTION The material contained in this training program is based on the information obtained from current national, international and company regulations and it is to be used for training purposes only. At the time of designing this program contained then current information. In the event of conflict between data provided herein and that in publications issued by the authority, the authority shall take precedence.

INTRODUCTION - GENERAL

INTRODUCTION GENERAL Crew Resource Management is a process to maximise the safety of flight operations using specific training to inform crewmembers of the traps they face daily in their operations. The process is also intended to change certain behaviours. This training can lead to the reversal of bad habits or practices, which can create an atmosphere that, can lead to a mishap. As a crewmember, you must have a clear picture of operational traps and errors, which can lead to a mishap. There are very few “new” causes of accidents. New people are making a mistake that has been made before causes most accidents. An anonymous quote is very applicable to safety, “If you don’t learn from the mistakes of others, you will never live long enough to make all the same mistakes yourself”. CRM training is a journey toward a safer operation and not a destination. Your safety in aviation operations is dependent on your participation in this journey.

The agenda for this class consists of the following: * Brief History of CRM Mishaps * CRM Versions * Goal of CRM * Human Factor-Performance and Limitations * Shell Model * Vigilance/Monitoring/Intervention * Fatigue * Threat and Error Management (TEM) * Swiss Cheese Model * Automation * Information Processing * Situation Awareness /Knowledge and Application * Shared Situation Awareness * Stress and Stress Management * Effective Communication and Coordination * Teamwork and Synergy * Decision Making * Leadership / Followership * Delegation * Workload Management * Conflict Management * Attitude and Behaviour * Assertiveness/Intervention * Resilience Development * Surprise and Startle Effect * Personality Awareness * Self Assessment & Self Criticism * Cultural Diversity * Company Culture & SOPs * Video Exercise

BRIEF HISTORY OF CRM MISHAPS

11 BRIEF HISTORY OF CRM MISHAPS THE EVENT THAT STARTED CRM WAS THE MISHAP IN TENERIFE, CANARY ISLANDS ON MARCH 27, 1977. DUE TO A BOMB THREAT IN SPAIN MANY AIRCRAFT CROSSING THE ATLANTIC DIVERTED INTO TENERIFE. THE RAMP AND TAXIWAYS WERE FILLED WITH PARKED AIRCRAFT. A Pan American 747 and a KLM 747 planned to depart at about the same time. The weather conditions were poor due to low visibility on the runway. KLM taxied first followed by the Pan American aircraft. The Pan Am aircraft missed the taxiway they were supposed use to taxi clear of the runway and advised tower. The KLM Captain told his First Officer he was ready for takeoff and began to put power up for takeoff but the First Officer told him he did not think they were cleared by ATC. The KLM Captain told the F/O to get clearance. The Tower asked Pan Am for their position and if they had cleared the runway. Pan Am told tower they were still on the runway and did not clear. The KLM Captain stated they were cleared and began his takeoff in the low visibility conditions. Pan Am tried to exit the runway but the two-aircraft collided killing 583 people. This is still the worst aviation accident in history.

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On December 28, 1978, United Airlines Flight 173, attempting to land at Portland, Oregon, had a minor gear problem. The Captain elected to hold and have the crew work on the problem. The Captain went through the checklist for the problem and talked to the maintenance base for assistance. The Flight Engineer and the First Officer both tried indirectly to tell the Captain of their limited fuel status but were unable to get him to understand the problem. During the subsequent approach to Portland the aircraft ran out of fuel and the aircraft crashed with ten fatalities. United Airlines began the first Cockpit Resource Management Program in the US.

The Kegworth Air Disaster occurred on 8 January 1989, when British Midland Flight 92, a Boeing 737-400, crashed onto the embankment of the M1 motorway near Kegworth, England. The aircraft was attempting to conduct an emergency landing at East Midlands Airport. Of the 126 people, aboard, 47 died and 74, including seven members of the flight crew, sustained serious injuries. This mishap was caused by a breakdown of communication between the flight crew and the cabin crew. The cabin crew observed fire coming from the left engine but assumed the pilots would know which engine. The pilots did not get an indication in the cockpit of which engine was on fire and did not ask the cabin attendance for information on what they had seen. The pilot's shutdown the wrong engine.

CRM VERSIONS

CRM VERSIONS "Cockpit" Resource Management : Cockpit Resource Management started in late 1970's to early 1980's after the Tenerife and Portland accidents. The focus of the training was how the cockpit crew functions as a team and how to use the resources available to you. It included emphasis for the other crew members to be willing to speak up. It also emphasized that the Captain must be open to input from the crew.

"Crew" resource management: In the mid to late 1980's the second generation of CRM was "Crew" Resource Management to include coordination and communication with flight attendants & others. The training was usually done in a joint training format. The focus of the training was on all the crewmembers getting along and that the Captain needed to be open to inputs from all the crew including the Flight Attendants.

Advanced CRM, Threat & Error Management The focus of this training is identifying, trapping & mitigating threats and errors in line operations. Although the training was still theory-based training the emphasis changed from the concept of the crew "getting along" to an emphasis on dealing with operational threats and errors. The theory of Threat and Error Management states that all humans make mistakes and those mistakes if not caught can lead to mishaps. The theory states that it is only human to make a mistake but as a crew these mistakes need to be identified, trapped and mitigated. The mistakes can be errors of omission, the crewmembers did not do something they were supposed to do or errors of commission, they did something should not have done.

Reality-based training. This training also focuses on identifying, trapping and mitigating the operational threat and errors. It strives for behavioural modification by learning through real time threat experiences of others.

GOAL OF CRM

GOAL OF CRM The Goal of CRM is to improve operational safety through: improvement of crew coordination, better crew

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communication, establishing and maintaining teams working together for the safe completion of each flight, establishing and maintaining operational situation awareness, and maintaining high levels of technical proficiency in aircraft operations, systems and standard operating procedures.

The present focus of CRM is to improve safety and reduce the threat of traps faced daily in flight operations. The major focus of training is on the "Human Element" of operations. Everyone is susceptible to the effects of stress, fatigue, rushing and breakdowns in communication. This class will focus on those operational threats and how the "Human Element" can create either a positive or negative outcome when facing those threats in your aviation.

The video clip you are about to view was adapted from the NBC show "Saturday Night Live" and the clip was designed to take some comic commentary on the movie "Top Gun". The video does show a "challenging personality" that each of us has had to deal with in the cockpit and in other walks of life. The original versions of CRM would have focused on how we should try to all "get along" with the Captain in this clip. The real focus of this clip is how to find a way to open and maintain lines of communication with an individual like this. This is challenging in normal operations but even more difficult in an emergency. Play the video clip and consider how you would deal with this person in a position of authority. Ask yourself how you have handled this personality in the past.

HUMAN FACTOR- PERFORMANCE AND LIMITATIONS

HUMAN FACTOR- PERFORMANCE AND LIMITATIONS The human element is the most flexible, adaptable and valuable part of the civil aviation system, but it is also the most vulnerable to influences that can adversely affect its performance. Human error is the causal or contributing factor in the majority of aviation occurrences. These errors are often committed by highly trained, qualified, experienced and motivated personnel. Human error is a natural outcome of output from the human brain that uses predefined scripts and other shortcuts to complete goal-oriented behaviors. These shortcuts sometimes lead to errors. Human Factors knowledge contributes to decreasing accidents and incidents in civil aviation as well as to mitigating the impact of those accidents and incidents. An error attributed to the human component of the system may have been associated with inadequate or inappropriate training, badly designed or implemented procedures, or a poor layout of checklists or manuals. Human Factors is concerned with people in their working environments; about their diverse relationships with the technological elements, with procedures, with the internal and external environmental factors; and with their relationships with other people.

SHELL MODEL

SHELL MODEL SHELL framework was first developed by Edwards in 1972 and later modified by Hawkins in 1987. The SHELL framework is derived from the initial letters of its four components: Software (policies, procedures, processes), Hardware (technology), Environment (workplace conditions) and Liveware (human). The liveware, or the human element, is the centre piece of the framework representing the most critical and flexible component. The limits of the human component in the system are not clearly delineated, so the other components of the system must be carefully matched to it.

Liveware-Liveware Interactions

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LIVEWARE-LIVEWARE INTERACTIONS This is the interface between people. Cabin crew, flight crew, air traffic controllers, maintenance engineers and other operational personnel function as teams, and team influences play a significant role in determining behavior and performance. This interface is concerned with leadership, crew communication, coordination and cooperation, teamwork, attitudes and cultural interactions. Staff and management are also within the scope of this interface, as organizational culture, corporate climate and operational constraints which can affect human performance. Mismatches can occur through; * Inappropriate or poor communication between individuals. * Imbalanced authority and workload. * Ineffective leadership. * Poor crew coordination.

Liveware-Hardware Interactions

LIVEWARE-HARDWARE INTERACTIONS This is the interface between human operator and machines in the workplace such as aircraft features, equipments, displays and control surfaces. Mismatches can occur through; * Poorly designed or located equipment, instruments and control surfaces. * Insufficiently trained users. * Inappropriate or missing operational material.

Liveware-Software Interactions

LIVEWARE-SOFTWARE INTERACTIONS This reflects the relationship between the individual and supporting systems found in the workplace, such as regulations, policies, standard operating procedures (SOPs) and processes, which include manuals, checklists and instructions. Mismatches can occur through; * Insufficient or badly designed SOPs. * Confusing checklists, manuals or documentation.

Liveware-Environment Interactions

LIVEWARE-ENVIRONMENT INTERACTIONS This is the interface between human operator and both the internal and external environments. These factors include temperature, noise, vibration, pressurized cabin air, low humidity and turbulent weather conditions. Mismatches can occur through; * Reduced performance and errors due to fatigue and disturbance of normal biological rhythms or irregular work / sleep patterns. * Poor employee morale or negative organisational culture.

VIGILANCE / MONITORING / INTERVENTION

VIGILANCE / MONITORING / INTERVENTION Vigilance refers to sustaining attention on something so as to notice when a non-ordinary event happens. The human brain is not set up to monitor unchanging or non-signaling independent parameters for long periods. No matter how much good intention or motivation someone has, they will still be subject to vigilance decrement. Vigilance decrement is a direct factor of the time and task, Vigilance decrement is not under voluntary control and is not a factor of motivation. Even when workload is low, it is almost impossible to maintain high levels of vigilance.

(Ref: CAP 737 Flight-Crew Human Factors Hand Book CAA UK) Elements that are seemingly unchanging, or have no direct feedback to the main task, or are rarely consequential, or are not easy to interpret, will often be dropped quickly. Modern automated flight decks contain a lot of information sources that fit these descriptions. Because of this it can be tempting for pilots to stop monitoring, or to be distracted from the monitoring task, particularly when the autopilot is engaged. The

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aircraft was in the cruise with the autopilot fully coupled when the commander (PM) became aware that the first officer (PF) was staring out of his side window and that something on the ground had drawn his attention. The commander decided to time how long it would take before the first officer's attention returned to scanning the instruments. His attention was diverted for over three minutes. Pilots of all levels of experience are susceptible to this monitoring degradation and the brain is very quick to determine what is and is not worthy of attention in a scan.

Learning about vigilance decrement could prepare a pilot to support their colleague, being more aware that a lack of vigilance is not something that only happens at night or when fatigued. They will then be less surprised and more confident to intervene if they recognise a lack of vigilance in a highly competent and fresh colleague. Additionally, the colleague will be more receptive and encouraging of the intervention if they understand the reality of the vigilance issue in themselves. Fatigue and high workload can increase vigilance decrement. Pilots should be aware of the possible traps which can cause distraction, maintain alertness and readiness to respond critical to events, that is not yet present. It is important to focus on the right task, at the right time. Effective use of checklists, will help to rank priorities.

FATIGUE

FATIGUE Fatigue is defined as a physiological state of reduced mental or physical performance capability resulting from sleep loss or extended wakefulness, circadian phase, or workload (mental and/or physical activity) that can impair a crew member's alertness and ability to safely operate an aircraft or perform safety-related duties. Sleep is essential for restoring the normal balance between the different parts of the central nervous system. The normal sleep requirement is 8 hours in every 24-hour period. During sleep, the body's physical functions are rested and some renewal takes place. Sleep loss can accumulate over time into what is referred to as "sleep debt". Sleep loss leads to increased reaction time, reduced vigilance, cognitive slowing, memory problems, time-on-task decrements and optimum response decrements.

Besides sleep, the other major influence on waking performance and alertness is the internal circadian clock. Many body functions have their own circadian rhythm and they are synchronized to a 24-hour pattern. Crossing time zones and moving to a new light/dark schedule can create internal and external desynchronization. The internal clock can take days or weeks to readjust. Sleep debt and fatigue can also occur as a result of regular early morning starts, long multi-sector days, low motivation and low levels of external stimulation.

Symptoms of fatigue include; * tiredness * slow reactions * diminished motor skills * diminished visual acuity * reduced short term memory capacity * channeled or tunneled concentration Effects of fatigue include; * reduced awareness * easy distraction * poor instrument flying * increased slips and mistakes * abnormal mood swings

Fatigue Management

FATIGUE MANAGEMENT Sleep disturbance and/or circadian disruptions, may be successfully counteracted if proper preventive measures are taken. The following recommendations are general and have to be adapted to one's own need; * Exercise regularly. * Get a good sleep before flights. * Do not go to bed hungry or with an over-full stomach. * Limit the liquid intake before sleep. Excessive liquid intake increases the need to go to the toilet and wakes you up. * Avoid heavy

work and exercise before going into bed. * Avoid alcohol, caffeine and nicotine before sleep. * Make your bedroom as dark and as quiet as possible. * If you feel fatigue on duty, do some stretching exercises. * Having a cup of coffee and conversation with other crewmembers can help to maintain alertness.

THREAT AND ERROR MANAGEMENT (TEM)

THREAT AND ERROR MANAGEMENT (TEM) (REF: CAP 737 Flight-Crew Human Factors Hand Book CAA UK / IATA / GUIDANCE FOR TURBULENCE MANAGEMENT) The practical summation of threat and error management for flight crew is the practice of thinking ahead in order to predict and avoid errors and operational threats, and manage any that occur. There is an old saying: A superior pilot uses his superior judgement to avoid situations that would require his superior skills. The TEM framework is a conceptual model that helps to understand the relationship between safety and human performance in daily operations. It helps operators to capture data from everyday flights and as well as from incidents and accidents. With this data, operators can develop information that assists in understanding strengths and weaknesses, clarify human performance needs thus contributing to improve the effectiveness of its training interventions, and consequently to an efficient safety management of operations.

The basic components of the TEM framework are: Threats – generally defined as events or errors that occur beyond the influence of crew, which increase the level of operational breakdown, and which must be managed to maintain flight safety. Errors – generally defined as actions or inactions by crew that lead to deviations from organizational or crew intentions or expectations. Unmanaged and/or mismanaged errors frequently lead to undesired states. Errors in the operational context thus tend to reduce the margins of safety and increase the probability of undesirable events. Undesired states – generally defined as operational conditions where an unintended situation results in a reduction in margins of safety. Undesired states that result from ineffective threat and/or error management may lead to compromised situations and reduce margins of safety aviation operations. End state – final event that completes the incident/accident sequence. An end state can be responded to, but margins of safety are not recoverable. There is no going back.

SWISS CHEESE MODEL

SWISS CHEESE MODEL Dr. James Reason, from the University of Manchester, developed the concept of the 'Layer of Protection' Swiss Cheese Slide. His basic concept stated that everyday you go out to fly there are many layers of protection to prevent an accident from happening. As you can see on the slide, I have listed a few of the possible layers. Crew input, training, aircraft design, and ATC RADAR are just a few of the many layers. Dr. Reason also stated that within each layer of protection there are 'holes' in the layers, which can allow you and your crew to pass to the next layer. These holes are generally a person or persons either doing something they were not supposed to do or not doing something that they should have done.

Most mishap studies show that human error is a key element in 60-80% of all accidents. If you and your crew pass through all the layers of protection, your flight would have a high probability of having an accident. If you review many aviation accidents, you will find that there are many factors that lead to the accident. This slide helps explain how it could

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happen even to a great crew. Notice that I put 'Pilot Procedures' as the last layer. Who always gets blamed for aviation accidents? The pilots, because people feel they should have done something! Also notice the layer just before the Pilot Procedures is 'Situation Awareness'. In almost every major accident you can find a major change in the situation awareness of the pilots that led directly to the accident. In the cockpit you are often forced to make a decision with limited time. Generally these decisions have a good outcome but if all your layers of protection are gone, it might not.

TYPES OF THREATS

TYPES OF THREATS A 1995 NASA study of threats faced by flight crews in mishaps and normal operations found that the types of threats could be classified into three basic types. * Expected threats were identified * Unexpected threat * Unknown threat

Expected Threats Were Identified

EXPECTED THREATS WERE IDENTIFIED First, expected threats were identified. These threats are situations that most all pilots have faced and are very aware can happen to them on a regular basis. Pilots are normally prepared for these situations due to their training and life experiences. Pilots are very vigilante for these situations and are well prepared when they see these threats developing. Examples of expected threats are: frontal movements moving adverse weather into the route of flight or destination airport, extended holding times due to weather, runway incursions, or excess fuel burn.

Unexpected Threat

UNEXPECTED THREAT The second type of threat is the 'unexpected threat'. This can be defined with the statement 'I knew it could happen to me but I didn't see the threat until the last minute'. An example of this threat that has caused many accidents is attempting to land on a runway that has standing water from a rainstorm and attempting to land at too high an airspeed. The result can be a runway excursion.

Unknown Threat

UNKNOWN THREAT The third type of threat is the 'unknown threat' or 'I did not know I did not know that'. Many automation management errors are caused by a limited knowledge of the different modes of highly automated aircraft and how to correct a critical situation.

AUTOMATION

AUTOMATION Automation dependency has become a major concern to many in the aviation industry and can lead to more possible mishaps in the future. The more modern aircraft entering service in the aviation industry today have a very high level of automation. The automation was intended to reduce the workload that was performed by three crewmembers in to a two-person operation. Many systems were introduced to take advantage of advances in computer and navigational improvements. Systems were designed to protect the aircraft from mistakes of the pilots, however these 'improvements' did not work out as planned.

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In this video you will see an example of the outcome of flight of an A320 aircraft at the Mulhouse-Habsheim Airport in 1988 during an airshow. The aircraft was new and the crew had just completed training on the new model. They were trained to fly the aircraft at the highest level of automation. They were asked to takeoff and return to the airport to do a flyby at 100 ft AGL configured for landing and then circle the field and make another pass at high speed:

As you can see the outcome what not what was planned. The aircraft went into the 'Autoland' mode and the pilots were not sure how to manually override the automation. The result was three fatalities. Perfect example of 'I did not know, I did not know that' or an unexpected threat.

It is highly recommended that all operators have a published automation policy for their operations, that include the following: Pilots must know and be proficient at all levels of automation: FMS: Long-Range Strategic Changes FMP: Short-Range Tactical Changes Hand Flying: Escape procedures, Fix a unknown problem, Immediate direct control required Practice flying at all levels of automation Pilots must know automation limitations/traps Pilots must use 'Raw Data' when available Cross Check: Jepps Charts, FMS Data and Raw Data Always confirm with both pilots before 'Execution' Confirm aircraft is responding correctly

The same NASA study showed that pilots generally catch about 68% of the threats occurring around them in most situations. Another layer of protection (ATC, GPWS/EGPWS, another crewmember) catch another approximately 31% of threats. Depending on the workload and situation awareness of the crew an additional 1% of the threats can get by all the layers of protection. If you look at the low accident statistics of commercial aviation, you can see that this situation does not happen often. If a threat does get by all the layers of protection, the crew is then susceptible to an accident. CRM is a tool to make all crewmembers aware of as threats to their operation.

INFORMATION PROCESSING

INFORMATION PROCESSING (CAP 737 Flight-Crew Human Factors Hand Book CAA UK) 'Information Processing' attempts to explain how the human brain responds to incoming information. It is a general theory that can help to understand areas such as situational awareness and decision-making. There are three fundamental stages: 'information input', 'processing', and 'response' INPUT (INFORMATION IN) When senses such as a sound or sight, are stimulated, the stimulus is remembered by a special 'sensory memory' just long enough for an unconscious interpretation 'perception' to determine whether the stimulus is important enough to draw the person's attention to. Hence for incoming information to be processed, it must be sensed, perceived and noticed. PROCESSING (PROCESS THE INFORMATION) Processing compares incoming information to long-term memories in order to interpret it and decide what to do next. Processing takes mental effort. Operations such as hypothesising, assessing, calculating, decision-making, or any other thought process can be referred to as 'processing'. RESPONSE Responding usually takes a physical or verbal form (doing or saying) but there are other responses such as thoughts, eye movements, doing nothing, etc. Well-learned motor skills require almost no attention (i.e. 'fire and forget'). This is very effective and efficient but it can lead to a problem if the wrong skill is triggered and then continues unnoticed.

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Information processing theory can help practitioners articulate or understand a mental task. Consider a complex task such as making a divert decision. It involves input, processing and actions. The information comes from many sources and causes heavy processing in working memory. A problem at any stage of information processing could affect the outcome, for example: * Sensing: Failing to hear an important radio call about the weather at the diversion, due to turning the volume down during a critical discussion. * Perceiving: Misperception of the fuel gauges (selecting an airfield too far away). * Processing: Miscalculating the crosswind vector at the diversion airfield. * Responding: Accidentally selecting a speed of 140 knots rather than a heading of 140 degrees. Almost all actions and operations can be analysed in this way, including quick and simple tasks. Identifying the problem stage can help inform solutions.

SITUATION AWARENESS /KNOWLEDGE AND APPLICATION

SITUATION AWARENESS /KNOWLEDGE AND APPLICATION The definition of situation awareness; the cognitive relationship between each individual's understanding of the actions and outcomes actively occurring in real time for the crew in individual situations. Identify some specific situation awareness traps in line operations; discuss some specific warning signs to help identify some of the traps the crew can experience; discuss some strategies to identify and avoid these operational traps and finally discuss techniques to regain situation awareness if you face one of these traps.

'SITUATION AWARENESS IMPLIES AN ALERT ACTIVE ASSESSMENT OF AIRCRAFT POSITION RELATIVE TO TERRAIN, OTHER AIRCRAFT AND THE AIRPORT. IT IS AN ENERGIZED CONSCIOUSNESS THAT NOT ONLY EMBRACES EVERY ASPECT OF THE AIRCRAFT ENVIRONMENT BUT ALSO INCLUDES A COMMITMENT TO DO IMMEDIATELY WHATEVER IS NECESSARY TO ENSURE THE SAFETY OF THE FLIGHT.' This is an example of a formal definition of situation awareness developed by scholars of aviation psychology.

At times each crewmember can have a different situation awareness perception of the operation at any given point. This can lead to a break down in the cockpit, which can lead to delay in taking an action needed to address a trap in the present operation. One operational method to define your state of situation awareness is addressed on the three questions on this slide. * Where are we? * Where are we going? * What could get in our way? If all the crewmembers have the same answers to these questions, the chances are you have a very effective situation awareness of your circumstances.

Where Are We?

Let's look at each question and apply it to line operations. Where are we? Does each of the pilots know the position of the aircraft, at all times, in relation to the following: desired course, assigned altitude, and correct airspeed? Is the course the crew is flying, the course that was flight planned or assigned by ATC? Does the crew have a proper three-dimensional cognitive understanding of their position in the planned flight? Do all crewmembers share the same position awareness?

Where are we going? Does the entire crew share the same perception of the planned path ahead? Does everyone agree that your flight plan agrees with your clearance? Does everyone agree on the procedure to get to the next waypoint or if a change is received, does entire crew agree on the new waypoint? Does everyone agree on assigned altitude and airspeed

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to reach the new or next waypoint?

What could get in our way? This is a question that is very seldom addressed but is the key factor in many aircraft accidents. What could get in your way while flying to the next waypoint? It could be terrain, severe weather, restricted airspace or another aircraft. It could be that within the cockpit there are two or more different perceptions of the present position and where the aircraft is going. This is an example for 'What could get in our way'; if ATC clears your aircraft 'Direct to' a fix or destination, what did they really mean? Were you cleared 'present position direct to the fix' or were you cleared 'present position directly along your flight planned route to the fix or destination'. What can get in your way if you do direct to the fix? Is your present altitude adequate for terrain clearance if you go direct to the fix? If you're not sure of the clearance, you can't be sure of the result of going direct.

Aviation is never static but always dynamic. Situation awareness is constantly changing, sometimes in seconds. Because of this constant change, the crew must also constantly make changes to their perception of the situation to correctly react to these changes. The crew must always know the answers to these three questions; * Where are we? * Where are we going? * What could get in our way? And be in agreement within the cockpit in order to stay out of harm's way.

Shared Situational Awareness

SHARED SITUATIONAL AWARENESS Shared situation awareness can be defined as, all crewmembers having the same level of situation awareness. This can lead to a break down among the crewmembers, which can lead to delay in taking an action needed to address a trap in the present operation.

There are some additional questions crews can ask themselves as a check to see if they have a shared degree of situation awareness. Do you see the big picture? Are you cognitive of the challenges or traps you are facing? What are the traps at the present time in your operation? What are the factors you face on this approach: low visibility, terrain, wet runway, tailwind on approach and landing, excessive speed on approach due to ATC procedures, lack of familiarity with the area or what ATC want you to do? What can affect your view of the big picture: fatigue, stress, rushing or your desire to just get the aircraft on the ground? Are you in the loop? Is the crew communicating effectively? Do all crewmembers share the same threat and the plan? Is the crew ahead, with the aircraft, or behind the aircraft during the operation? With the dynamic situations you face and the speeds at which you fly, a crew can quickly get behind in procedures and lose a cognitive connection to the vertical and/or lateral path of the aircraft, which could become disastrous. Do you have a plan B? Has the crew developed and brief a backup plan in case the desired primary plan fails? If your primary plan for say arrival changes dramatically the entire operation can suffer a huge loss of situation awareness trying to develop a plan B as you attempt to aviate and navigate. What if? Have you asked your crew, what are we going to do if the ILS is out or the visibility changes for the worst? If you don't ask what if, you probably don't have a plan B?

Once you have gained a proper level of situation awareness, how do you maintain that level especially when in a challenging situation? We will give some suggested ways to handle critical situations that can cause a loss of situation awareness. This process follows the same basic procedure taught for decades when dealing with a critical situation. First,

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maintain aircraft control. What actions does that require and in what order? Aviate - fly the aircraft! Maintain a safe altitude, attitude and airspeed to keep the aircraft under control at all times. Navigate - fly the aircraft to a location or position that a safe landing can be made. Communicate - tell the crew, ATC and others what you plan to do and how you're going to do it. The crew must accomplish all these items in that order of precedence. Often crews will focus excessively on communicating prior to aviating or navigating. The outcome can be loss of situation awareness and possibly a mishap.

Analyze the situation. The focus of the majority of training, in recent years, has been on identifying a warning light or gauge showing an abnormal condition. The crew then pulls out the checklist for that condition and completes the procedure. We no longer look for other indications of abnormal conditions like circuit breakers popped prior to starting a procedure. In other words, we really don't analyze the situation but jump right into the checklist for the indicated problem. We try to fix the symptom but miss the problem. A perfect example is a crew flying a descent with the throttles in idle. During the descent, one of the generator failure lights come on with an accompanying master warning. The crew generally will pull out the checklist for generator failure; complete the checklist, which would include starting the APU for an additional electrical source. When you level off, the autothrottles advance. That is when you find out your right engine flamed out during the descent. The generator failure light is a symptom not the problem. While you are analyzing the situation you need to look for all the threats you are facing. For example, during the descent we just discussed, is terrain a threat, low visibility, language barriers with controllers, etc.

Take proper action. Once you know what the problems really is and not just a symptom of the problem, then you take the proper procedure to handle your situation. Close the loop. Once the crew has completed the proper action it is time to review what has been accomplished. Verify what has been done and agree on the next sequence of actions to take. The Captain should set the priorities and actions to be taken and crew should make inputs and carry out the decisions or actions that the Captain has established.

To review of maintaining situation awareness again; * First maintain aircraft control, o Aviate - fly the aircraft o Navigate - fly the aircraft o Communicate - tell the crew, ATC and others * Analyze the situation * Take proper and, * Close the loop

Maintaining Situation Awareness

MAINTAINING SITUATION AWARENESS Let's discuss some techniques to maintain situation awareness. The first step to keeping situation awareness is to plan and prepare for each flight. It is important to carefully review weather information for your route, destination and planned alternate. Adjust your plan for possible convective activity en route or at your destination. Select one or more adequate alternates if the weather at your destination looks questionable. Carefully review the maintenance log and the MEL for conditions that affect the conduct of your flight. Carefully review you planned route and plan emergency airfields en route. In other words begin to form a Plan B in case your original plan falls apart due to weather or an aircraft malfunction.

During flight, the Captain should distribute the workload so no one crewmember becomes task saturated in normal or abnormal situations. Once a crewmember becomes task saturated, they loose shared situation awareness with the rest of

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the crew. I necessary reassign duties to meet the demands of each situation. Since the Captain is the situation manager in critical event, it might be better to have the co-pilot fly the aircraft and communicate with ATC. Avoid having both crewmember distracted by some change in the operation. One crewmember needs to continue to fly the aircraft while other crewmembers deal with the distraction.

Ask yourself 'How do you recognize a deteriorating situation? Do you have some 'red flags' that you have developed to key you in on that fact that the situation is starting to get out of hand? Once you recognize the situation is changing quickly, how do you deal with the workload increase and possible loss of situation awareness?

The following are just a few of the possible 'red flags' that your situation is changing: Any time ATC or someone else changes your clearance or your plan. If you hear 'Change to read', 'You are re-cleared as follows' or 'Cleared as filed, except'. Now the door is open to numerous combinations of possible situations that you will have to review based on your original plan. Can you still handle the change with the time and fuel available to you? Are you going to have less fuel than planned? Does that change put in more challenging situation than originally planned?

Ever hear this in the cockpit, 'We can make it but it will be close?' A definite red flag that your crew is being backed into a corner that could lead to some poor decisions or worse later. I'm not sure about this! Is there a difference in situation awareness in the cockpit? If one pilot feels uncomfortable about a decision or situation, it is important that they voice this discomfort. If you review even a few mishaps, you will find at least one crewmember has a sense that the situation is not safe at one point or another. This is a major red flag that the crew does not share the same picture of the situation at hand.

Ever had a discussion in the cockpit about what the controller is trying to do with your aircraft? Is he keeping you high and fast? How far is he going to take you out on downwind before he turns you back to final? Did you ask for the plan? Many times crew allow themselves to be put in an operational corner due to the controller's actions. A controller can totally change your plan of action by handing you his plan instead of your own.

Ever lost position awareness? Where are we in relation to the localizer or the field? Does that affect your plan? How did that happen? It was a great plan but something changes that put you in a corner. How many times have you heard, 'this doesn't look right to me?' An excellent example a red flag suggesting a loss of situation awareness. Does he want us to start down now? You don't know what the controller has in mind, you don't know his plan. His situation awareness is not shared with you. These a just a few common red flags that your crew has lost situation awareness or the same situation awareness is not shared between cockpit member and/or with ATC. Any combination can be fatal.

STRESS AND STRESS MANAGEMENT

STRESS & STRESS MANAGEMENT Aviation is a constant dynamic state of change and with this constant change comes stress. During periods like take off and landing the workload can be extremely high a causing an increase in the level of stress. When crews are fatigued and/or rushed the stress level increases even more. In these situations it possible for the situation awareness level of either or both pilots to be so focused on one area of the operation to the point that errors or

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threats occur which the crew does not identify in other parts of the operation. Usually referred to as Task Saturation, this situation can quickly lead to a mishap.

How do you manage stress? Crewmembers cannot eliminate stress in their operations; stress will always be there. The crews can manage the level of stress by controlling their actions in normal and abnormal situations. One major controlling factor is workload management. The Captain must assure that the workload stays balanced so everyone stays in the loop and that all crewmembers have the same situation awareness. Effective leadership and communication is essential to this situation. If any crewmember feels that the stress level has reached a point where safe operation of the aircraft is in question; they should communicate that to the Captain or PIC. In these cases a missed approach or go-around or other manoeuvre should be performed to reduce the stress level to a manageable point. Planning is also a key to reducing stress. The better prepared the crew is for the threats and errors that they can face; the better their chance of reducing stress levels during the critical phases of flight. Crew should have a "Plan B" or a backup plan for all situations so that when change does occur, they can react effectively at a reduced stress level.

(Ref: CAP 737 Flight-Crew Human Factors Hand Book CAA UK) Physical wellbeing can assist in developing resistance to stress. Actions to deal with stress include: * Recognise the factors that are combining to cause the stress. Assess one's own situation to see which of these factors is present; * If stress is being produced by overload, pause to organise a list of priorities. Do not allow low priority problems to influence when not intending to deal with them. In flight, follow standard operating procedures and use check lists; * Involve other people. Communicating and avoiding isolation is an effective way of lowering the level of stressors; * Learn how to relax physically and mentally. It may help to consciously relax one's muscles whenever feeling tense or stressed; * If the situation allows, take a short break. * Physical fitness seems to make some people more stress resistant. Eating regular balanced meals and indulging in physical activity several times a week promotes general health; * Be positive and tackle responsibilities and problems as they occur. Avoid the tendency to put things off in the hope they will go away; * Recognise own limitations and avoid over commitment.

EFFECTIVE COMMUNICATION AND COORDINATION

EFFECTIVE COMMUNICATION AND COORDINATION Communication is one of the major keys to safe operations. The crew must always communicate effectively to perform peak proficiency. What is effective communication? A formal definition is a process by which information, thoughts and feelings are exchanged in a clearly understood manner.

(Ref: ICAO CIRCULAR 300-AN/173 HUMAN FACTORS) Communication takes place when information is transmitted from one or many senders to one or many receivers. Communication among flight crew, cabin crew and passengers plays a vital role in the performance of procedures concerned with aircraft operations under normal and abnormal operating conditions. Crew members communicate to exchange information, to build and reinforce common goals, action plans and expectations, to compare the understanding of a current situation, to monitor activity, to transmit the organizational culture, create a professional yet friendly work environment and to avoid and manage conflict situations.

Certain accident reports tragically demonstrate the importance of timely and effective communication between the cabin

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and flight crew. The investigation report on the Dryden accident (DRYDEN –AIR ONTARIO/FLIGHT 1363-CANADA 10.MARCH.1989) revealed that such communication may be impossible due to differences in professional and organizational cultures. The Dryden investigation found that cabin crew did not communicate critical safety information (wet snow on the wing) for a number of reasons such as professional respect and an assumption that the pilots were already aware of the situation. Fokker F-28 aircraft crashed 49 seconds after takeoff, killing 21 passengers and 3 crewmembers. There are many other causes of this accident such as; no ground de-icing or walk around by the flight crew, unserviceable APU, pairing of inexperienced crewmembers, failure to follow up by the ground handler and training deficiencies. However, if the cabin crew informed the flight crew about the condition of the wing surface, they could have prevented the accident and save many lives.

What are communications barriers? Anything that interferes with or blocks the communication process is a communication barrier. There are two basic types of barriers environmental and participant based. Environmental barriers affect the medium of communication such as the noise level in the cockpit, the workload and the location of the resources. If you're talking on the radio or intercom and the connection is poor, the message could be confused or lost. If you're receiver is not in the aircraft or in the cabin, the message could be confused due to a loss of body language. The sender and receiver introduce participant barriers into the communication process. The attitude and emotional state of the participants can adversely affect communication. The education level and use of words can also adversely effects communication.

How do you establish and maintain effective communication for flight operations? The first step to effective communication is an effective briefing. The briefing sets the tone for the entire flight. The briefing is often not considered essential to an experienced crew; however, it can be the key to successfully handling any critical event during the flight. The briefing should include the entire crew if at all possible. The Captain can outline what they expect from all crewmembers and also show that they are open to information from both inside the cockpit and cabin. This is the first step in team building with other crewmembers. By asking for questions and feedback from other crewmembers the Captain can close the "loop" in the communication process. They can make sure the entire crew is working on the same plan and all pulling in the same direction. It is also essential to debrief critical flights to review the communication procedures to see if there were differences in expectations and how that situation could be resolved in a similar situation in the future.

(Ref: ICAO CIRCULAR 300 AN/173 HUMAN FACTORS IN CABIN) Aboard an aircraft, flight and cabin crew pursue the same objectives: flight safety, effectiveness and efficiency. However, the cabin and flight crew often have evolved within two distinct technical cultures. In most organizations, these two categories of personnel are managed by two separate departments. This organizational separation has resulted in discrepancies in training, manuals and procedures. It is important that the differences between the two professional cultures do not hinder optimal communication. Standardized training of certain procedures, such as emergency evacuations, is one way in which each group is exposed to the other's professional culture. Each must learn more about the other to ensure good communication during a flight.

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TEAMWORK AND SYNERGY

TEAMWORK AND SYNERGY (Ref: ICAO CIRCULAR 300 AN/173 HUMAN FACTORS IN CABIN) To improve aviation safety and security, flight and cabin crew need to communicate, cooperate and work as a team. Individual, team, task and work characteristics influence team processes and team performance. Even qualified crewmembers may perform poorly as a team. When crew perform well together, they work in synergy. Synergy is the creation of a whole that is greater than the simple sum of its parts. When in synergy, the performance of a team of people working together is higher than the sum of each individual's performance (Ref: Salas et al., 2000). Clearly defined roles and responsibilities for each crew member should contribute to increased synergy. To generate synergy among the crewmembers, certain conditions need to be met: * task allocation (Who does what?) * authority allocation and leadership, since every team needs a leader. * a friendly and professional environment

It is also essential that all crewmembers back each other up through crosscheck procedures and acknowledgement. Most normal, abnormal and emergency checklist call for some form of cross-check and acknowledgement of completion of each item. The more critical the event, the more important a careful crosscheck of procedures becomes. It is very easy for one crewmember to become task saturated during a critical event. Once that occurs, that crewmember is essentially not a member of the team anymore. Many aircraft mishaps have occurred because one or more of the crew becomes task saturated and fails to spot a critical point in an event due to over tasking. Effective coordination between all crewmembers are required to assure a safe flight. Proper communication and team building with flight attendants, gate agents, dispatchers, ATC and others that can affect the proper operation of the flight are mandatory. The Captain sets the tone for this coordination and begins the team building process. Hand in hand with effective communication and coordination is the process to develop and maintain an effective team.

DECISION MAKING

DECISION MAKING The Wilhelm & Law Study showed that the Captains are the "decision-makers" and the First Officer and Cabin Attendants are the "decision-facilitators". With reference to the Captain's experience and 'rated' technical expertise they look at a situation, gather as much data as possible, solicit input from the crew, and "make a decision" on a course of action. Due to the dynamic environment in which you operate, decision making can take place in a matter of seconds, in which case the Captain/PIC may have to make an immediate decision based on their years of training and experience, and just take action.

Cabin crew should not hesitate to report a critical information to the flight crew. Cabin crew inputs such as visual cues, smells or abnormal conditions in the cabin, can participate in the Captain's decision making process. In the event of critical conditions, in which the cabin crew cannot communicate with the flight crew, considering the consequences of a delay, the cabin crew should evaluate the current conditions and make a decision on the safest action to take.

If time permits the decision-making process should include: Anticipating problems in advance, Using SOPs to guide the decision-making process, Seek input from all available sources, Avoid biasing the source of information, Consider the weight and impact of alternatives, Select appropriate courses of action in a timely manner, Evaluate outcome and

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adjust/reprioritise actions, Recognise the stress factors when making decisions and adjust accordingly, Avoid jumping to a decision and then try to gather facts that support your decision.

LEADERSHIP AND FOLLOWERSHIP

LEADERSHIP AND FOLLOWERSHIP Leadership is the ability to influence and guide a group of individuals to achieve a common goal. (Ref: ICAO CIRCULAR 300 AN/173 HUMAN FACTORS IN CABIN) A good leader has relevant technical knowledge, communicates effectively to diverse audiences in diverse circumstances, coordinates activities, manages the team, deals with conflict effectively and has superior listening skills. A leader also provides support to the team members by contributing to their development. To be an effective and efficient team requires a leader. The leader's role consists of: * building the team, * clearly stating expected results, * coordinating and monitoring activity, * managing workload and time, * preventing and addressing conflicts, * listening and implementing team member inputs, * making decisions.

What are some of the techniques to being an effective Captain? An effective Captain must show leadership. How do they do that? All Captains have a certain amount of authority granted them by their State of Certification. They have the ultimate authority and responsibility for the safe operation of the flight. In addition to the authority, is the need to be an effective leader of the crew? Leadership requires much more than authority. A leader must pull the rest of the team together with the objective of effectively and safely completing the flight. The leader must get and keep some degree of respect from the rest of the crew through effective communication and understanding for the other members of the team. The Captain must set priorities and communicate a plan of action for the rest of the crew. The Captain must expect followership. They should expect other crewmembers to contribute to briefings and share concerns with the rest of the crew. They must also expect the crew to comply with the Captain's decision once made. The Captain must use all the resources available to help make decisions. They must establish a tone that is open for all crewmembers to participate in the decision process. The Captain must also use all the abilities of crewmembers to maximize their resources on each flight.

If the entire crew is contributing to any problem faced in your operation the chance of success is improved over just the Captain making a decision on his own. That leads us into a discussion on assertiveness. How do you speak up to question a plan or decision if there appears to be a conflict with procedures or other regulations? The crew needs to approach the Captain with some degree of respect for the position when there is some disagreement with a decision or plan. Ask for or provide information to the Captain to clarify a decision or plan. If the crew is still concerned about the outcome of the decision or plan, safety is considered to be jeopardized, then the crew should object in a clear and concise manner to the perceived threat.

DELEGATION

DELEGATION Delegation is the assignment of responsibility and authority to other crewmembers to perform specific tasks. (YOU CAN'T DO EVERYTHING YOURSELF!) Delegation is an essential skill for effective leadership and workload management. Delegation makes work easier and improves the effectiveness of all crewmembers. The basic steps of delegation are; * Determination of the right tasks to be delegated, * Assigning the most capable crewmember to perform

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the task, * Defining the task clearly, confirming understanding and setting a deadline, * Supervision and evaluation (Provide guidance / monitor progress / evaluate performance)

Delegation Barriers: * The belief that 'I can do it better myself'. * Worry of loss of power or appearing lazy. * Lack of trust in colleagues. Frightened of consequences of their mistakes. * Inadequate training. * Ambiguous task description. When used appropriately, delegation is a valuable tool for crewmembers to conduct safe and competent flight operations. Poor delegation may cause frustration and confusion to all the involved crewmembers.

WORKLOAD AND TIME MANAGEMENT

WORKLOAD AND TIME MANAGEMENT (Ref: CAP 737 Flight-Crew Human Factors Hand Book CAA UK) All conscious operations, such as; problem solving, decision making, calculating, managing tasks, thinking, etc. cause workload. The more attention is required and used, the higher the workload is said to be. Workload can be expressed as the amount of attentional demand. In practice, workload is directly affected by four general task factors (Jarvis 2010). * 'Difficulty' of the task * Number of tasks running in parallel (concurrently) * Number of tasks in a series (switching from task to task) * The time available for the task (speed of task)

High workload and feelings of not coping with the workload can cause stress. Increasing workload contributes to fatigue and decrease human performance. Reduced workload may decrease the level of alertness, creating monotony and boredom. Another effect that occurs with high workload, is the attentional narrowing. Because the attention is narrowly focused, other events and stimuli that would normally draw attention, fail to do so. Hence, information outside the task can be missed.

A poorly planned glider flight under a low cloud base developed into a very low level circuit. With the increasing workload and considerable anxiety, I became fixated on the landing area. The low height and strong tailwind exacerbated the sense of speed to such an extent that I ceased to monitor the ASI. I was very lucky to survive the stall and spin accident that destroyed the glider. The pilot's attention was narrowed to the critical area of concern: the landing area. The pilot was unsure whether he could make the circuit work. Under high workload, the scan of the ASI was dropped because powerful but unreliable speed cues were available from the peripheral texture flow that falsely reassured him of the airspeed. The workload and anxiety were strong enough to overcome all the pilot's experience and training in this respect.

Dealing with high workload is problematic for individuals once they are in a high workload situation. Several other effects mean that high workload may not be recognised for what it is, at the time. Firstly, the perception of the time changes so that it feels like less time has passed; hence the higher speed of tasks is less obvious. Secondly, high workload tasks are so absorbing, that individuals may not consider the workload that they are under. They might not have the time and capacity to step outside the situation briefly to consider their own effectiveness. More realistic triggers for initiating management are recognition of the changing situation before the workload elevates, recognition of high workload in a different crew member, or recognition of the task characteristics and types of situations (rather than recognising the effects of them). Skilled tasks require attention to learn, but once learned use very little or no attention. This is the brain's

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main strategy of workload reduction: to turn repeated tasks into skilled routines, so that they can be performed in the future without demanding attention, and therefore generating workload.

CONFLICT MANAGEMENT

CONFLICT MANAGEMENT Conflict is an interpersonal process that arises from disagreements over the goals, needs, thoughts or values of involved parties. Potential for conflict is always present when more than one person is involved in any activity. Conflict is going to happen in life, in every normal human relationship, regardless of our best intentions and efforts to avoid it. Is conflict a bad thing? Not necessarily. Often, a conflict presents opportunities for improvement. Properly managed conflict can improve group outcomes. Unmanaged or poorly managed conflicts cause loss of trust and productivity. Conflict management is the process of identifying and handling conflicts sensibly, fairly, and efficiently. The objective is to find an acceptable, if not agreeable, solution to everyone.

Roger Fisher and William Ury developed the IBR approach for conflict management. They argue that you should resolve conflicts by separating people and their emotions from the problem. Their approach focuses on; - resolving conflicts by separating people and their emotions from the problem, - building mutual respect and understanding, and - resolving conflict in a united, cooperative way. To use the IBR approach effectively, the conflicting parties need to follow these six steps: 1. Make sure that good relationships are a priority. Treat others with respect and discuss matters constructively. 2. Separate people from problems and discuss issues without damaging relationships. Focus on what is right, instead of who is right. 3. Listen carefully to different interests and try to understand their point of view. 4. Listen first, talk second. You should listen to what the other person is saying before defending your own position. They might say something that changes your mind. 5. Set out the "facts." Decide on the observable facts that might impact your decision, together. 6. Explore options together. Be open to the idea that a third position may exist, and that you might reach it jointly.

ATTITUDE AND BEHAVIOR

ATTITUDE AND BEHAVIOR Behavior is the response of an individual in a certain way toward someone or something. Attitudes are the evaluative statements or judgements concerning objects, people or events. During childhood, we form attitudes that last a life time. Attitudes can be positive or negative, reflecting how we feel about something. Attitudes may be affected by age, position, experience, environment, culture and education. Some positive attitudes are; * Smiling, * Being helpful, * Avoiding un-necessary arguments, * Trying to understand others and respect their feelings, * Feeling concerned, * Collaborating with team members, * To believe in team work. Some negative attitudes are; * Criticize or blaming others, * Being nervous and argumentative, * High conflict behaviors, * Being chronically unhappy and dissatisfied, * Difficult to work in a team,

Individual and organizational benefits of positive attitude: * Creates a pleasing personality * Increases popularity and enjoyment of life * Inspires others * Increases effectiveness * Solves problems * Improves team work and relationship with others * Reduces stress How can we build a positive attitude? Start with changing your focus from negative to positive in your life. Look for what is good, instead of looking for what is bad. Stop complaining about the things you do not have. See the things that you have and be thankful. Improve your occupational knowledge. Build a positive self-esteem. Stay

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away from negative influences. Try to understand other persons and see things from their point of view as well as your own.

ASSERTIVENESS / INTERVENTION

ASSERTIVENESS / INTERVENTION Assertiveness is a behavioural skill, in which an individual is aware of his/her rights, opinions, wishes or needs; stands up for them non-aggressively and speaks up confidently to make suggestions and requests. Assertiveness skill became increasingly popular and thought by many personal development experts, during the second half of 20th century. Assertiveness is a skill that can be learned and improved. This communication skill will enable you to improve your self-confidence and increase your overall ability to communicate effectively at work or in social life. However, assertiveness should not be confused with aggression. Assertiveness is being neither passive, nor aggressive. Passive individuals hardly share their thoughts, feelings and opinions. It is difficult to understand what they really want. They hardly speak up and are afraid what other people might think of them. They need to be liked by others. Aggressive behaviour is based on winning. Aggressive individuals do not consider the rights and desires of others. They only care about their own best interest. Aggressive behaviours impair trust and mutual respect. Assertive behaviour includes a rational mind, confidence, insistence, respect to others, politeness and positive thinking. An assertive individual can express opinions and feelings honestly, without excessive anxiety.

Poor communication skills, results in conflict that can create ineffective teamwork. Assertive communication style is the most effective form of communication. It is based on mutual respect and trust, expressing thoughts and feelings confidently, willing to minimize conflicts and other obstacles to teamwork. Assertive individuals speak up confidently for something but they don't necessarily get it. Their intent is to find a reasonable way of solution, considering the rights and thoughts of others.

Assertive Communication Techniques * Express your feelings and thoughts confidently and appropriately. * Use 'I' statements. For instance, prefer saying 'I disagree', rather than 'You're wrong. * Keep your voice in a calm and clear tone. * Keep your body posture relaxed. * Have a good eye contact? * Listen carefully without interrupting and try to understand the thoughts and feelings of others. * Feel in control of yourself, do not get aggressive. * Learn to say 'No' to unreasonable requests. * Have knowledge about your subject and be well prepared to answer questions.

RESILIENCE DEVELOPMENT

RESILIENCE DEVELOPMENT Resilience development is the ability to enhance people's adaptive capacity so that they can counter unanticipated threats. The key factor of being resilient is to be prepared for unexpected surprises, by anticipating problems and developing precautionary measures to deal with them. Resilience development refers to the ability of crewmembers to: * Learn (know what has happened), * Monitor (know what to look for), * Anticipate (find out and know what to expect), * Respond, (know what to do and be capable of doing it).

Mental flexibility is essential to recognize and response critical changes. Mental flexibility is the ability to quickly and accurately restructure one's current thoughts and actions to respond adaptively to sudden and critical situations. To

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achieve mental flexibility, the crewmember should:

- * Keep in mind, that the current situation may change in important respects, from those experienced previously.
- * Have the capability to anticipate the initial cues that indicate a problem or an event that may result with a problem.
- * Have the capability to respond to a critical situation, in which there is no set procedures, by adapting expertise and using logic.

* Maintain situational awareness and have technical and procedural knowledge to recognize that the course of action needs to be changed and have the confidence to make the change when necessary.

* Use all available resources, communicate effectively and listen to the alternative explanations and other points of view. It is the small details which can make the difference between a safe flight and a disaster. Resilience development makes these details visible and will help to make our job safer and more efficient. (Captain Mark Frank)

SURPRISE AND STARTLE EFFECT

SURPRISE AND STARTLE EFFECT (Ref: CAP 737 Flight-Crew Human Factors Hand Book CAA UK) The startle reflex is the physical and mental response to a sudden, unexpected stimulus such as, sudden noises, unexpected tactile sensations, abrupt shocking perceptions, the sensation of falling, an abrupt visual stimulus or simply fear. The startle reflex can enable individuals to react with appropriate actions: to run away, to fight, or sometimes freeze to be a less visible target. A skilled motor task will be momentarily disrupted by a startle reflex but return to normal within 5-10 seconds. At Present simulator training does not include "startle" training, or the sudden change in situation awareness due to an unexpected change in aircraft attitude or the onset of environmental conditions that make the actual determination of the aircraft's actual energy state difficult to recognize. There is little evidence that a startle reflex alone creates much of a sustained or lasting impact on cognitive functions, although there are some minor and short lived physiological changes such as raised heart rate and blood pressure. Brain activity changes: we think less and react more instinctively.

Air France Flight 447 was a scheduled flight from Rio de Janeiro to Paris, that crashed into the Atlantic Ocean on 1 June 2009, killing 228 persons including the passengers and the crewmembers. The BEA's final report of investigation stated that the aircraft pitot tubes were obstructed by ice crystals, while in high-altitude cruise through turbulence, causing loss of airspeed measurements. The autopilot was disconnected automatically. The crew reacted incorrectly and made inappropriate control inputs that destabilized the flight path. The startle effect played a major role in the destabilisation of the flight path and in the two pilots understanding the situation. The crew failed to respond to the repeated stall alarms. The aircraft entered an aerodynamic stall, from which it did not recover and crashed into the Atlantic Ocean at 02:14 UTC.

(Ref: GRIFFITH UNIVERSITY-SAFETY THROUGH EDUCATION AND RESEARCH) Individual and crew strategies for improving startle performance are:

- * Maintaining high levels of technical proficiency in aircraft systems and performance,
- * Having a healthy expectation and suspicion for things going wrong,
- * Mental preparation of action plans, for both normal and non-normal events, (Focusing on; what would I do if....)
- * Constructive scenario discussion in low workload periods, (Discussing what would you do if...)
- * Effective situational awareness, teamwork, communication and monitoring skills,
- * Effective crew threat and error management practices.

PERSONALITY AWARENESS

PERSONALITY AWARENESS (Ref: CAP 737 Flight-Crew Human Factors Hand Book CAA UK) Psychologist Hans Jurgen

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Eysenck (1970) developed an approach to personality involving two major factors: Neuroticism-stable (N), and the Introversion-extraversion continuum, (E). A low neuroticism personality is one of an emotionally stable person, whereas a high-neuroticism person will worry and to get upset easily. Extraverts are said to be impulsive and sociable, introverts are more withdrawn and cautious. In addition to these two main factors, three others are commonly added to create 'the big five' personality factors. These are agreeableness (A), conscientiousness (C), and openness to experience (O). In order to obtain a measure on these five dimensions, tests such as OCEAN (openness to experience, conscientiousness, extraversion, agreeableness and neuroticism; (Collis 1997) are used. The 'big-five' personality factors are seen across most modern approaches to personality, even if not specifically labelled as such.

Personality Awareness is all about knowing yourself, identifying your thoughts, emotions, abilities, strengths and weaknesses. Personality awareness is understanding your own personality and how it is perceived by others. The better you understand yourself, the better you are able to accept or change who you are. Our personalities and self-esteem develop throughout our lives through our experiences with different people and activities. Healthy self-esteem is based on our ability to acknowledge our strengths and limitations accurately and to accept and to value ourselves unconditionally. Becoming self-aware is the first step in overcoming personality defects. Self-awareness can be achieved through observing your own mistakes, asking others for feedback, and observing others mistakes objectively. Thus, you can objectively analyse your mistakes and find practical solutions to change for the better.

SELF ASSESMENT AND SELF CRITICISM

SELF ASSESMENT & SELF CRITICISM None of us like to be criticised. Our ego wants to believe we are always right. Quite often we cannot see our faults, even though they maybe obvious to others. Self criticism is to be honest with our-selves. Self criticism is essential to learn from our mistakes and to improve our perspective on life. Self criticism does not mean feeling useless and worthless. Self contempt associated with vulnerability can lead to depression. Remember, 'No one is perfect'. 'People make mistakes'. Our mistakes are an essential part of our self improvement. The important thing is to accept our mistakes as an opportunity to learn and overcome our weaknesses.

CULTURAL DIVERSITY

CULTURAL DIVERSITY (Ref: ICAO HUMAN FACTORS IN CABIN SAFETY DIGEST NO.15) Our thoughts, behaviours and motivations are partly related to our national and cultural background. People who have grown up in different countries have different values, particularly in social situations. A polite behaviour in one country may be perceived as rudeness in another country. Culture fashions a complex framework of national, organizational and professional attitudes and values within which groups and individuals function. The power of culture often goes unrecognized since it represents 'the way we do things here' - the natural and unquestioned mode of viewing the world. However, the reality and strength of culture become salient when we work with a new group and interact with people who have well-established norms and values. Helmreich and Merritt (1998)

Cultural diversity among crew members and between crew members and passengers is an inevitable part of the operational and organizational environment. Awareness of cultural differences is necessary to minimize

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misunderstandings that may arise among crew members of differing cultural backgrounds and result in breakdowns in communication and coordination. Such issues can also be addressed with respect to the cultural diversity of passengers. Crew members, especially those destined to operate in multinational crew, must be made aware of the significance of cultural diversity and the importance of understanding each individual's culture. Operational safety culture is the way to resolve the problems of culture and personality traits with an optimal culture that applies to aviation professionals.

COMPANY CULTURE AND SOP

COMPANY CULTURE AND SOP CRM is only a small part of what should be an overall company safety culture. A safety culture is more than just putting up posters and having mandatory safety training/meetings. A company that has a safety culture will balance profitability and safety. Safety should not be thought of as the long way to do the job. Directions are published in Standard Operating Procedures (SOP). Safety should always be "the way" to do everything in the company. SOPs are sometimes seen as the hard way or the time-consuming way to get things done. SOPs have been developed through the years because of accidents, injuries and fatalities that have already occurred. They were developed to stop a re-occurrence of the same loss. The entire company from the leadership down has to be committed to a culture of doing things by the book or by the published SOPs. The focus cannot be allowed to shift to cutting corners or finding an easier way to accomplish a task in violation of SOPs.

SUMMARY

SUMMARY You have successfully completed the course. Hopefully, you can benefit from this lesson to; * Assure safe and efficient flight operations, * Reduce error, * Avoid stress, * Increase your cognitive and interpersonal skills. We wish you safe and pleasant flights.

REFERENCES: * ICAO Circular 300-AN/173 / Human Factors Digest No:15 * ICAO Doc 10002 AN/502 / Cabin Crew Safety Training Manual * Civil Aviation Authority UK / CAP 737 Flight-Crew Human Factors Hand Book * IATA Guidance for Turbulence Management * Griffith University / Managing Startle - Individual, Crew and Organizational Strategies

COURSE END

End of the Course.