

**PAN AMERICAN WORLD AIRWAYS
FLIGHT TRAINING -- A NEW DIRECTION
FLIGHT OPERATIONS RESOURCE MANAGEMENT**

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The Pan Am Flight Training Department would like to share with you the experiences we are having in our attempt to integrate cockpit resource management philosophies into our training programs. We will also show you a slide-tape presentation on Pan Am's new direction in flight training, but first lets look at how Pan Am got where it is today.

Pan American's commitment to flight crew training is synonymous with the date this airline commenced operating. Long before flight crew training programs and training facilities were federally mandated, Pan Am had established specific training programs for its flight personnel. Over the years this training has consistently been under review and has been modified to reflect changing standards and trends within the industry.

In the early 1970's, with the introduction of the B-747, SBO concepts were to become the cornerstone of Pan Am's training environment. Crew concept was being introduced as an integral part of the new training experience.

In 1974, a flight operations review team chaired by David D. Thomas, former Deputy Administrator FAA and then President of the Flight Safety Foundation, recommended the further development of crew concept to include more realism in the simulator proficiency check, with increased emphasis on line-oriented operations.

In 1984, ten years after the introduction of crew-concept training, Pan Am commissioned a flight operations review team to examine every aspect of flight operations, to identify problems and to provide solutions. The primary purpose for conducting this study was our concern for flight safety. No limits were placed on who the team could meet with, or on what the team could examine, observe, discuss or recommend.

The team was composed of five members from Pan Am and five members from the aviation industry, including the Honorable John K. Lauber, who at that time was Chief of the Aeronautical Human Factors Research Office at NASA-Ames Research Center.

Several recommendations were made by this group following completion of their study. One was that human factors training should be introduced to supplement a successful crew-concept training program already in place. Another was that line-oriented flight training (LOFT) offered a unique opportunity for improved training, particularly in the area of command, resource management, crew concept and problem solving, and that LOFT type training should be implemented as soon as possible. This lead to the establishment of a team within Pan Am to determine how best this training, that is training in human factors, could be accomplished.

The slide presentation that I'll show you in a moment was initially prepared by this team to convince the Flight Operations Department management that the recommended program for human factors training should be implemented and that it was a required part of the proposed annual training exemption. This presentation has been modified several times. In its present form it has been used to introduce our three-day seminar and to give the participants some background on the how and why of the new direction in training at Pan Am. We hope it will do the same for you.

[EDITORS' NOTE: The following is the script from the slide-tape presentation. It is a good example of the use of that communications media and provides the complete message, even without copies of the slides. The numbers in parentheses are the numbers of the slides.]

ANNUAL FLIGHT TRAINING

(Script)

- (1) Pan Am International Flight Academy
- (2) Recurrent Training: The Past, The Present, The Future
- (2a) The Future: Annual Flight Training

(3) As we all know, when a passenger buys a ticket to fly with us, we automatically enter into a contract with him to provide safe passage to his destination. We hope to provide him with a pleasant trip and an on-time arrival. However, overriding these and all other factors is our dedication to safe flight. Safety is not only a contractual and moral obligation, it is a business necessity.

(4) Crew training is an important element in this commitment to safety. Crew training is expensive and becomes more so each year. Our obligation in Flight Operations is to ensure that we are spending our training dollars not only wisely but efficiently.

Most of us in this room have been involved in aviation for a lot longer than we would like to admit. We're pretty sure of what works. At least we know what has been working. When a change is suggested we are usually on the skeptical side. "If it ain't broke, don't fix it" is not far from our philosophy. This is understandable when you consider that most changes produce controversy, endless argument and the consumption of valuable time. Trainees, union representatives, instructors and others have to be convinced that the change is necessary and not just for change-sake.

(5) In training, we are approaching a juncture where we need to review our programs, examine our opportunities and chart the way for the future. Obviously any change must meet our mandate for safety of flight and for a well-trained crewmember. New technology allows this.

(6) Since our present programs were instituted, a combination of factors or circumstances have intervened to allow us to now consider change. Simulator improvements is one of these factors.

(7) Improved simulator technology provides greater computer capacity and iteration rates, better visual systems, a motion system which provides much improved motion cues and airplane control-feel dynamics that duplicates the airplanes. Furthermore, Phase II simulation will include three-dimensional windshear dynamics, stopping and directional-control forces to cover six variations in runway conditions, representative brake- and tire-failure dynamics, operational navigational systems including INS and OMEGA, sound of precipitation and significant airplane noises which are perceptible to the pilot during normal operations, an improved visual presentation such as variable cloud density and partial obscuration, four-window field of view, and lastly the capability to present ground and air hazards. The end result is a simulator that truly simulates the airplane and a training vehicle we have long awaited.

(8) Pan Am's Board of Directors approved \$2.9 million to allow us to update our present simulators to these state-of-the-art standards. This program is well underway and will be completed by mid-1986. All A300 and A310 simulators will be delivered with these improvements. What do we do with these simulator improvements? Do we keep plugging on with the same old programs or do we take advantage of these technological improvements?

(9) Every indication seems to say that now is the time for change. Other factors or circumstances which support change and which have received FAA and ALPA endorsement are Flight Operations Resource Management and Line-Oriented Flight Training (LOFT) programs.

(10) Let us now spend a few moments on LOFT. Most of you are familiar with the LOFT concept, but let me briefly review it. LOFT is a total training concept which requires line airmen to occupy the same crew position, the same duties, the same responsibilities, and the same roles they have in day-to-day operations. It covers a flight from crew report-time to the blocks at destination.

(11) With that brief review of what LOFT is, let us look at some of the advantages of this type of training. First of all, LOFT is realistic training. Each training scenario is for a total flight, including all operational considerations.

LOFT permits the opportunity to encounter irregularities and operational problems in a line environment which cannot be duplicated for training purposes during a real line flight. LOFT is effective in gauging not only the crew's knowledge of the airplane and the elements in which it operates but also the judgment and cockpit resource management that is demonstrated during all phases of flight. In summary, LOFT not only covers how you fly the airplane, but how the total crew works together under Pan Am's crew concept.

(12) LOFT is always training. It is full-mission simulation. There are no interruptions--no freezing of maneuvers for discussion and analysis. The flight is a real flight, in real time, from beginning to end.

(13) LOFT provides the environment for the following cockpit resource management principles as practiced through the use of crew concept:

- o Resource management
- o Crew coordination
- o Crew communications
- o Crew management
- o Timely decision-making
- o Use of specific procedures
- o The problem-solving process

An examination of air carrier accidents, almost without exception, points to a breakdown in one of these areas as being the primary or at least a contributing cause. And these are the very problems that LOFT addresses.

(14) We in training have been following the development of LOFT for years. We have studied the various guidance material developed by the FAA, studied what other air carriers and NASA had to say about LOFT, developed various LOFT scenarios, and experimented with these scenarios in our simulators. Other airlines have already adopted some version of LOFT into their training programs. Without exception, these companies and their crewmembers report LOFT as one of the biggest advancements made in crew training. The FAA has recognized the value of LOFT and has issued various Advisory Circulars and exemptions of regulations which permit the use of LOFT in recurrent training in lieu of periods devoted to the practice of maneuvers and procedures.

(15) Now let us look at the other major item which the FAA requires as part of its new approach to recurrent training--Flight Operations Resource Management.

(16) Historically, pilot training has focused on flying skills and systems knowledge while neglecting or ignoring such factors as how pilots communicate with one another, the effective sharing of relevant information, and the process of decision-making. In recognition of this most important frontier in aviation safety, flight operations resource management has been developed to provide learning in the personal and interpersonal values and behaviors which are essential to optimum performance in the cockpit.

(17) Flight Operations Resource Management objectives include:

- o Definition of the individual crewmember's role
- o Recognition of effective communications
- o Recognition of resources available
- o Recognition that CRM is the responsibility of all crewmembers

(18) Flight Operations Resource Management produces total performance of the crew which is greater than the sum of the performances of the crewmembers taken independently. That is synergy.

(19) The FAA has recognized the importance and validity of cockpit management training by allowing recurrent training to be accomplished on an annual basis when management training is coupled with LOFT. United Airlines has been using a similar program since 1981 with excellent results.

(20) NASA studies over the last ten years indicate that well in excess of sixty percent of fatal air carrier accidents were not directly related to mechanical failure or lack of pilot skills, but were due to a breakdown in crew concept and resource management in the cockpit. These NASA studies have emphasized a deficiency in present recurrent training in that the accidents appear to occur largely in areas related to human factors in which the industry does not train, does not evaluate, does not check.

(21) This deficiency in human factors training is also true for Pan Am. A look at those accidents that occurred from 1970 through 1974 and involved either fatalities or substantial damage revealed that the cause of 73 per cent of these accidents is related to cockpit management.

(22) As a result of these accidents, Pan Am in 1975 created a flight operations review committee. It was chaired by David D. Thomas, former Deputy Administrator-FAA and the then president of the Flight Safety Foundation. One of the recommendations of this committee was that crew-concept training be introduced. The accident figures for the ten years following 1975 have decreased and the percentage of cockpit management-related accidents have dramatically decreased to fifty-six percent.

(23) To further improve flight safety we must make the crew concept more effective. A tool to accomplish this is flight operations resource management.

(24) Pan Am's Flight Training Department has made an in-depth study of how this type of training could be developed and then offered to the airmen.

(25) This Pan Am study recommended purchasing a cockpit resource management program as opposed to developing such a program in-house. The purchased program has been tailored by Pan Am and is presented as Flight Operations Resource Management training.

(26) Other flight training organizations within the aviation community are also emphasizing the use of cockpit resource management in their flight training programs.

(27) Here is what Pan Am's Flight Training Department's analysis produced after months of dissecting the training programs of other airlines and the UAL exemption which permits annual flight training. This analysis also involved evaluation of other companies which offer cockpit management training and then combined all of these considerations with those special problems and requirements of Pan Am.

(28) In order to adequately present the basic foundation to this new training program, it is necessary for each airman to participate in a three-day seminar. This seminar is a one-time requirement for each airman. Briefly here is what the seminar is all about. Flight operations resource management training is training which requires the airman, through introspection, to analyze his own management style. To achieve this introspection requires interaction on the part of the airman with other airmen. In the seminar, team-play will be actively used to produce the individual-to-individual and team-to-team interaction so vital to the germination of introspection and determination of the airman's own management style. It is not an attempt to measure personality.

(29) In the first year of annual training, each airman will be scheduled for one day of ground school which will cover emergency evacuation and emergency equipment training, security training, and airplane system training.

(30) This will then be followed by a LOFT exercise consisting of a two-and-one-half hour flight in the simulator. Following the LOFT training a self-critique will be conducted by the airmen to measure the effectiveness of the training. Following the LOFT flight, practice maneuvers will be accomplished in the simulator and the next day the proficiency check will be flown.

(31) In subsequent years, following the first year of transition to annual recurrent flight training, each year will consist of two days of ground school, one day of LOFT and one day for the proficiency check.

(32) The LOFT period permits the elimination of semi-annual recurrent training as we know it today. Annual training will not totally eliminate certain training accomplished during the present recurrent training. Procedures and some maneuvers will still be utilized, however, they will not be practiced in isolation but will be accomplished as a part of the total operation of the flight. They will occur as they would in line operation.

LOFT will also allow sufficient time for practicing maneuvers which are currently accomplished in the current training periods. It should not be overlooked however, that LOFT does enable the trainee to glean certain simulator familiarity during the conduct of the LOFT session and, in addition, certain required maneuvers may be signed-off during the LOFT and practice periods.

(33) Another advantage produced by the use of annual training relates to the proficiency check. First, both the LOFT period and the proficiency check utilize crew concept. Next, the proficiency check uses an enroute environment whenever possible.

These two factors plus improved simulation allow an airman to better demonstrate his true proficiency.

(34) Earlier in this program we mentioned the forces at work in the Industry and how these forces have produced various changes which are possible in recurrent training. We have just presented the Pan Am Flight Training Department proposal. Now lets look at the economic advantages of that proposal.

(35) The introduction of annual recurrent flight training will produce several substantial economic benefits to Pan Am. First will be a potential airmen productivity increase at each crew base. Annual training will result in a decrease in travel time for most airmen. In addition, one training day is eliminated. Therefore annual recurrent training offers a potential of an additional three days availability per airman at most base stations.

(36) All evidence indicates that now is the time to restructure Pan Am's recurrent flight training program. This is possible because of improved simulator technology, adoption of annual training, and the application of flight operations resource management concepts during line checking.

(37) Annual flight training produces a flight crewmember better trained to cope with today's operational problems and ensures the fulfillment of our number one goal--to produce the safest transportation possible for the traveling public. Today is your first step in that direction.

(End of Script)

Pan Am's unique situation in terms of demographics, the merger of two airlines and a recent recall of furloughed flight crewmembers had to be addressed. The median age of all cockpit crewmembers is fifty. Seventy percent of the airmen are between the ages of forty-six and fifty-four. In many cases, the captain, first officer, and flight engineer on a B-747 are about the same age, and were hired within three years of each other.

As a result of a complicated merger agreement between three unions, a situation also exists where the captain may not only be younger but may also have less seniority than other crewmembers. In addition, recalled airmen are moving into first-officer positions, and show a reluctance to be assertive when required.

The cockpit cultures described above have created a need for improvements in cockpit resource management. Human factors training in interpersonal behavior needed to be introduced to our airmen, and we are convinced that, despite the difficulty in introducing a new program, it is well-worth the effort in terms of improved safety.

Pan Am has committed over \$1 million for the initial introduction of our new Flight Operations Resource Management training program.