

# **Improving Cabin Crew Training for Emergency Evacuations**

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## **Abstract**

The assignment of cabin crew for safety duties on board an airplane is a legal requirement all over the world. JAR OPS Subpart 1.1005 and 1.1015 specifies that "cabin crew training for passenger handling include methods to effect a safe and expeditious evacuation of the plane in case of emergency ". But how are airlines, and specially those with (very) wide body aircrafts, implementing this requirement? How realistic is the training, especially in terms of stress and panicked environments? Are there discrepancies between different airlines' safety training programs? Are there discrepancies between stated programs and actual practice, and if so, how should this be handled by the Civil Aviation Authorities? This paper describes the terms of reference and the main objectives of a study which is being undertaken under the sponsorship of the French DGAC. The final goal is to produce recommendations concerning cabin crew safety training, particularly with regard to new training technology and environment simulation.

On a pleasant summer's evening, a twin engined jet with one hundred passengers on board was taxiing to a terminal gate. The plane was struck by a catering truck and a fire erupted outside the airplane. Many passengers saw the fire through the windows and immediately left their seats, opening the overhead bins to take their hand luggage. The cabin crew made announcements and tried to ask the passengers to remain seated. At the same time, the control tower informed the captain about the fire and, while stopping the aircraft and shutting down the engines, he made an announcement to the passengers and ordered an evacuation. The cabin crew initiated the emergency evacuation, however a flight attendant disconnected the evacuation slide when she attempted to pull the manual inflation handle causing the evacuation slide to disconnect from the left front door, just as passengers were beginning to jump outside. A dozen passengers were hurt, four of them seriously. Fortunately the plane was not a high 'jumbo'!

This is a hypothetical accident scenario, nonetheless it is a practical way to illustrate the challenges of cabin crew safety training. In this example, we can speculate that the cause of the poor evacuation and injuries was due to poor knowledge, inadequate skills, inappropriate procedures or a deficiency in training. Perhaps stress, fatigue, and other human factors also played a role.

## ***Background***

An emergency evacuation is a rare occurrence for airlines and even more rare for individuals. It is particularly stressful for individuals because in addition to its rarity and surprise effect, it can also be life-threatening. Many studies (e.g. NTSB/SIR/92/02) have shown that in emergency evacuations the sudden stress on cabin attendants has resulted in

significant performance losses, e.g. an inability to open doors which were in fact fully serviceable. To limit the negative impact of such stress, cabin attendants must be always on alert during take-off and landing phases and must be mentally prepared to handle an incident which is likely to result in an emergency evacuation.

But it is not sufficient to be 'mentally prepared'. We know that stress results from the instinctive and unconscious comparison between the perceived requirements of the situation and the internal image of one's competencies. Poor training can exacerbate a dangerous situation: If training is inadequate, one's confidence to handle the situation is weak, therefore the perceived stress is higher, and performance declines. If training is of a good standard however, confidence in one's competencies can ameliorate the stress, and performance can prove equal to the task.

To train staff for this type of positive reaction, training must be realistic, complete and planned so that cabin attendants learn to develop confidence in themselves and in other crew members. The objective of any regulations should be to make sure that the airlines which are responsible for training and on-line performance check the quality and efficiency of training rigorously. Cabin attendant training for emergency evacuations should meet a set standard: cabin attendants should be able to quickly assess the situation and ensure passengers' evacuation with the best possible result so as to enhance the chances of passengers' survival. JAR OPS subpart O concerning cabin attendants, para. 1.1005 and 1.1010 specifies that 'operators shall make sure that cabin attendants receive an appropriate training to motivate passengers and ensure the crowd control required for a fast evacuation from the aircraft'. However, there is some concern about this new type of training and the means being used to provide it. Training for emergency evacuations, i.e., crowd control in a panicked environment, is not being provided today in the true spirit of the regulations. There are too many discrepancies between airlines' training programs as well as in the execution of this training and its interpretation. Monitoring by the Authorities does not seem to guarantee the rigor required and much diversity currently prevails according to geographical location and airline size.

Reacting to these concerns, the department of DGAC ( Direction Générale De l'Aviation Civile - the French equivalent of the FAA) in charge of personnel training, namely the SFACT (Service de la Formation et du Contrôle Technique) has decided to review the current regulatory requirements intended to maintain a high level of safety training with reference to the latest research findings about passenger behavior and survival issues. Dédale has been selected to conduct this study, and this paper outlines our research aims and methodology.

### ***Aims and Scope of the Study***

The aim of the study is twofold: to perform a critical analysis of the current situation with regard the regulations, current training and practice, and to suggest relevant courses of improvement.

First, attention will be devoted to emergency evacuation procedures as defined in current operations manuals and safety and rescue manuals. Checks carried out by the Authorities will also be considered, as will current training methods, particularly the realism of training for emergency evacuations. Some effort will also be directed to the diversity of

training requirements for different airline sizes (e.g., the introduction of the very large aircraft raises complex problems with respect to on-board communication facilities, incident detection, co-ordination of operations etc.).

Following this broad investigation of current activities, specific recommendations will be proposed within the following areas:

- To increase cabin attendant awareness of evacuations (the reality of such an event and the physical and psychological phenomena they are likely to experience);
- To revise training syllabi to support such awareness (the introduction of concepts such as stress management, crowd control in a panic situation, the recognition of different types of behavior in this particular situation, the use of appropriate gestures and commands)
- To give greater consideration to training across the career-span of cabin attendants;
- To improve evacuation simulations; and
- To improve the monitoring of training and activities on the line

### ***Methodology***

The study will be conducted in five phases. The first will be devoted to a literature survey; the next two will involve a thorough investigation of the current situation and the state of the art in the field of emergency evacuation; the fourth task will address the issues raised by aircraft of different sizes, and the final task will be the summary report and recommendations for improving the current regulations concerning emergency evacuations. Supplementary information for the study will be gathered from several sources - persons who have lived through emergency evacuations (cabin attendants, flying personnel, passengers, firemen); a questionnaire for cabin attendants and safety trainers in airlines of different sizes, so that they can state their difficulties, expectations, and requirements in the field of both classroom instruction and practice; and meetings with the heads of specialized centers, such as the CAMI center in the USA and Cranfield University in England. Each of the study's tasks will now be discussed in more detail.

#### **Task 1. Survey of the literature**

A survey of the literature will be made with regard to :

- NTSB, FAA, CAA, and Transport Canada reports concerning emergency evacuations and cabin attendants' performance. These studies are to provide useful information on behaviors and the material conditions of evacuations;
- the assessment of accidents and incidents that have resulted in an emergency evacuation and what they can teach;
- an inventory of typical behaviors favorable or unfavorable to safety and therefore to successful or unsuccessful evacuations;
- human factors that apply to this type of situation (decision-making under acute stress, cooperation between crew members under acute stress, crowd management in a panic situation...);
- cabin attendants' behavior who have participated in emergency evacuations;
- passengers' behavior who have had to evacuate an aircraft (notion of crowd, anxiety, panic).

This preliminary work will provide a general overview of the studies conducted in the field of emergency evacuations. From this it will be possible to create typical scenarios of incidents or accidents incorporating the critical skills and procedures as identified by experts and survivors.

## **Task 2. Critical analysis of the current situation**

Currently, the French airlines submit their training programs to the DGAC. It would be instructive to examine them. Observations in different training centers would also enable us to assess the training designers' qualifications (professional and pedagogical), the quality and realism of the training procedures, the execution of the training in compliance with the syllabi, and the physical participation of every cabin attendant in evaluation exercises.

The study anticipates discrepancies between programs as written and the actual training, and will analyze the reasons for these discrepancies. In particular, the analysis will address educational, economic, and operational constraints. For example, are instructors competent, how and by whom were they trained, and what is the experience of those who have conceived the training courses and practice? What problems are related to an airline's culture and prevailing views of senior staff? (e.g., when safety training is considered as secondary to commercial training, and budgets are allocated accordingly). The assessment will also determine the extent to which the training tools used (mock-ups, door simulators, fire simulators, extinguishers, escape slides etc.) actually match the equipment used on the line, and the extent of their realism in practice. Finally, consideration will be given to the potential benefits and effectiveness of joint cockpit-cabin CRM training programs.

## **Task 3 : State of the art in the field of evacuation**

The state of the art in aircraft evacuation will be limited to the analysis of the US report and the AASK data base developed by the CAA. Looking outside aviation, we will also examine evacuation problems in such fields as the Navy, Eurotunnel, and civilian protection of public buildings. A visit to FAA specialized centers (CAMI - Civil AeroMedical Institute) to inquire about new passengers' evacuation techniques, could also be very useful to complete our knowledge and become aware of the applicability of some methods. All these investigations will give rise to the compilation of a summary report covering a description of the typical syllabus, pedagogical tools and methods available in the field of evacuation (within and outside aviation).

## **Task 4. Aircraft of different sizes**

An emergency evacuation of a very large aircraft (600 to 900 passengers) will require very strict procedures applied by cabin crew who are inexperienced on this type of aircraft initially. Therefore, it will be necessary to provide particularly thorough instruction and effective training for this new generation of aircraft.

On the passengers' side, we have to take into account the exponential panic effect of a truly large crowd of people. In case of evacuation, the impressive height of the upper deck will also cause considerable stress at the time of jumping into the slide. On the side of crew attendants, the risk is that they may feel as if they are moving between two aircraft, an upper deck and a lower one, and the coordination of crew attendants between the two decks will be particularly important. As well as double decks, we will also address the case of multiple-aisle aircraft. In

collaboration with the Airbus design offices, we will consider the various evacuation strategies considered for these types of aircraft in order to assess the implications for the training methods and tools.

Small airlines should not be forgotten either. The regulations apply to all airlines and as far as small airlines are concerned, cabin attendants must be just as well trained for emergency situations. The current training problem of these small airlines seem to be the existing gap between regulations, their interpretation by the airlines and the economic disadvantages of a small-scale operation. The aim will be to clarify the training targets and suggest structural solutions which are affordable to small airlines, e.g., the grouping together of training aids, training partnerships with major airlines, a large-scale specialized center offering services to several smaller airlines, development of appropriate educational tools (films), etc.

For aircraft of 19 passengers or less, there are no cabin crew and some recommendations will be made by the study specifically for the pilot in charge of cabin safety. Special information concerning safety will also be proposed for the benefit of the passengers of such aircraft.

### **Task 5. Final report**

A final report will be written iteratively in close collaboration with SFACT/R experts. It will then be submitted to the different actors of civil aviation in this field : airlines, cabin crew trade-unions, JAA Occupant Survivability Project Advisory Group, JAA Human Factor PAG, JAA Cabin Safety Study Group, JAA Human Factor Steering Group. This final report will include, in addition to a summary of the analyses performed, recommendations aimed at :

- organizing classroom instruction around the relevant knowledge and topics to be addressed (specifically related to human factors)
- organizing evacuation rehearsals and practice to the highest fidelity possible, i.e., representing and making emergency situations 'real' via scenarios, typical exercises and simulations. Particular attention will be paid to the realism of practice scenarios (mock-ups) for cabin attendants, the creation of LOFTs for joint training with flying personnel, and the integration of CRM concepts into emergency situations;
- improving pedagogical tools, especially with regard to exercises to be performed and training cycles;
- defining a rigorous training profile for instructors;
- proposing a feed-back system for emergency evacuation experience.

The Dédale Company is multi-disciplinary and cross-cultural. As well as myself, a cabin specialist with 32 years' experience on the line and in Safety and Standards Management for cabin attendants, the Dédale team includes psychologists, ergonomists, engineers, and an accident investigator. Combining our extensive knowledge of human factors in aviation with our real-world experiences in industry and training, we believe we can offer new insights into the analysis of current concerns and that we will be able to suggest realistic and affordable solutions. Our purpose is not to ask airlines to invest a lot of money in sophisticated training devices or to increase the cabin crew workload by adding courses but to improve the quality of training by using new training methods and concepts.

Aircraft manufacturers are working to improve fire survivability, develop passenger protections after an impact, and find solutions for effective and high speed evacuations. This

last item cannot be effective without a concomitant dedication to a high level of training for cabin crew. At the same time we acknowledge that there is now a high demand for cabin attendants, especially in Europe, due to the birth of a lot of new airlines and to traffic growth. At the same time, many airline policies are oriented toward dismissing the "old" cabin crew and hiring young and attractive cabin attendants. While this allows management to save money on salaries (and promotes commercial aspects at the expense of safety concerns), it nonetheless creates a high level of turnover, which in turn decreases the overall experience level and increases expenses for training. In such a volatile work environment, the setting and monitoring of specific, standardized requirements for training operations becomes crucial. The Civil Aviation Authorities will play a major role, perhaps the most fundamental role, in ensuring that cabin attendants receive the safety training they need to be effective safety professionals.

In conclusion, I look forward to reporting on the study's results and recommendations at a similar conference in the future.

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