



Training Demand Analysis for Airlines Safety Manager Based on Improved OTP Model

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Abstract. The problems existing in the training demand analysis for airlines safety managers are analyzed. In view of the shortcomings of the OTP model, the OTP model is improved, which enriches the content and dimension of the OTP analysis. Based on the improved OTP model and the actual operation characteristics of airlines, the training demand analysis model for airlines safety managers is established, and the process, dimensions and methods of airlines safety manager training demand analysis are defined. Finally, taking an airlines as an example, the analysis of the training demand for safety manager was carried out, and the courses were determined. The case shows that the model is very practical.

Keywords: Training · Demand analysis · Safety manager · Airlines
OTP model

1 Introduction

Safety manager training is an important part of airlines safety management. It directly affects the knowledge, ability and performance of safety managers, and then affects the safety level of airlines [1].

At present, the courses of safety managers training in airlines are mainly based on experience, subjective desire, requirements of higher level units, or training plans of external training units. Basically, there is no systematic and comprehensive training demand analysis based on the actual situation of the airlines. Finally, the training content is not consistent with the actual work needs, and the training effect is not very well.

At the same time, there is lack of in-depth research on the theory and method of training demand analysis for airlines safety managers, and there are no detailed and operable methods and tools.

Therefore, it is necessary to establish an airlines safety manager training demand analysis model. It provides the basis for airlines to carry out the safety manager training and improve the safety management ability.

2 OTP Model and Its Improvement

2.1 OTP Model and Its Shortcomings

In academia and other industries, the organizational-task-personnel (OTP) analysis model proposed by Goldstein is often used to carry out the training demand analysis [2, 3].

1. **Organizational Analysis.** By analyzing the development strategy, development goals, resources and culture of the organizational, the problems and challenges faced by the development of the organization are identified. In order to improve the core competitiveness and achieve the established goal, what training needs to be carried out to all types of personnel at all levels are determined.
2. **Task Analysis.** In view of a particular task, the knowledge, skill and ability needed to complete the task are analyzed. The competency model [4, 5] is built, which defines what features the personnel should have.
3. **Personnel Analysis.** The gap between the actual situation of the existing personnel and the competency model is analyzed, and the content of the training are determined.

The OTP model analyzes the training demand of a job from the perspective of entire organization. The training demand of individual personnel is closely related to the organization development, the tasks and the current situation of individuals, instead of only being confined to specific tasks or personnel. The analysis of training demand is more comprehensive and the result of analysis is more scientific. However, there are some limitations and shortcomings in the OTP model, including:

1. In organizational analysis, the model ignores the influence of external environment and its changes on organizational strategy and objectives, and then the influence on training demand, such as natural environment, social environment, and industry development and so on.
2. In task analysis, the model ignores the predictable changes in the task, and the resulting requirements for the knowledge and ability of the personnel, which will impact the training demand, such as automated operation instead of manual operation, paperless office and big data analysis.
3. In personnel analysis, the model mainly focuses on the gap between the actual performance of personnel and the ideal performance. It focuses on what training is needed for personnel to achieve the ideal performance level, and ignores what training they want to get from the aspect of own development and career development.

2.2 Improve the OTP Model

In view of the limitations and shortcomings of the OTP model, the model is improved. The main idea of the improvement is to carry out OTP analysis in the perspective of developing and dynamic.

1. In organizational analysis, besides analyzing the internal factors of an organization, the external factors should also be analyzed, such as government management policy, industry development, natural environment, social environment, etc. Determine the impact of external factors on the development strategy and development goals of the organization, and then determine what training should be carried out to cope with these impacts.

2. In task analysis, in addition to analyzing the knowledge and ability required for the current task, the development trend of the task should also be analyzed and determined what knowledge and ability that personnel should have to complete the future task. And then what training needs to be carried out in advance are determined.
3. In personnel analysis, in addition to analyzing the difference between current performance and ideal performance, we should also consider the training from the perspective of their own development and career development. And then determine what training is needed for the personnel.

3 Establish the Training Demand Analysis Model for Airlines Safety Manager

Based on the improved OTP model and the actual operating characteristics of the airlines, the analysis model for training demand of airlines safety managers is established.

3.1 Organizational Analysis

See Table 1.

Table 1. Organizational analysis

Dimension	Analysis content	Information collection	Output
Internal factors	<ul style="list-style-type: none"> –Long-term development strategy –Core competitiveness –Long-term safety goals –Organize culture –Safety culture –Changes of operation scale –Change of operation contents; etc. 	<ul style="list-style-type: none"> –<i>Airlines’ development planning</i> –<i>Airlines’ safety planning</i> –<i>Organizational culture construction program</i> –<i>Safety culture construction program; etc.</i> 	By analyzing the organizational development strategy, resources and external environment, the problems, opportunities and challenges that exist in the development of organizations will be identified, and what training should be carried out to promote the realization of organizational goals will be determined
External factors	<ul style="list-style-type: none"> –State safety supervision policy –CAA safety supervision policy –Development of the industry –Changes of social environment –Change of natural environment; etc. 	<ul style="list-style-type: none"> –The laws and regulations of the state and the CAA –<i>Development planning of civil aviation industry</i> –<i>Safety development plan of civil aviation industry</i> –<i>Development of civil aviation safety management</i> –<i>Analysis of the social environment of civil aviation operation</i> –<i>Analysis of the natural environment of the civil aviation operation; etc.</i> 	

3.2 Task Analysis

See Table 2.

Table 2. Task analysis

Dimension	Analysis content	Information collection	Output
Current task analysis	<ul style="list-style-type: none"> -Law of state safety -Safety regulations of the CAA -Safety management system and procedure of airlines -Best practice of industry safety management -Practice of excellent employees -Contents of the airlines operation; etc. 	<ul style="list-style-type: none"> -Law related to safety -Aviation safety management regulations of the CAA -Airlines' safety management manual -Airlines' safety management procedure -Experience in industry safety management -Operation manual of the airlines; etc. 	The competency model is identified, and the characteristics of safety manager will be defined, which involves the following aspects: professional knowledge, safety management knowledge, safety management capability, safety management literacy and so on
Future task analysis	<ul style="list-style-type: none"> -Development of the means of safety supervision of CAA -Development of operation technology -Development of safety management theory -Development of safety management techniques and methods; etc. 	<ul style="list-style-type: none"> -The development trend of the safety supervision policy of the CAA -The development trend of civil aviation operation technology -The trend of the safety management of civil aviation; etc. 	
Competency factors	<ul style="list-style-type: none"> -Identify the characteristics that the excellent safety managers should have 	<ul style="list-style-type: none"> -Analyze the typical events -Interview -Expert review; etc. 	

3.3 Personnel Analysis

See Table 3.

Table 3. Personnel analysis

Dimension	Analysis content	Information collection	Output	
			Current status of personnel	Conclusion
Professional knowledge	The professional background of the current safety managers, as well as the knowledge of the operation	Information collection is carried out in the following ways: –Professional background survey –Work experience survey –Work inspection –Examination –Interviewing –Questionnaire; etc.	Through analysis, the current situation of safety manager in professional knowledge, safety management knowledge, safety ability and safety management literacy is determined. The training expectation in the aspects of personal career development and quality improvement is determined	The current situation of safety managers is compared with the competency model, and the training needs of individuals are considered. And then what training needs to be carried out for current safety managers will be determined
Safety management knowledge	The safety management knowledge and experience of the current safety managers			
Safety management capability	The ability of the current safety managers to organize, communicate, coordinate, and so on			
Safety management literacy	The quality and working attitude of the current safety manager			
Personal training expectations	The training expectations of the current safety managers in the aspects of personal ability promotion, quality improvement, and career development			

3.4 Set up Training Program

Finally, the training content determined by the organizational analysis and the personnel analysis are integrated. In consideration of training resource, training time, training mode and so on, the training program of safety manager is finally determined.

4 Case Study

4.1 A Airlines Introduction

A airlines has been running for 3 years, and has 10 aircrafts. The main business is domestic passenger transport. Transportation routes mainly include coastal routes and plateau routes.

4.2 Training Demand Analysis for Safety Manager

4.2.1 Organizational Analysis

Through the collection and analysis of the internal and external information of the airlines, it is found that the organization has the following characteristics:

1. The airlines plans to increase the number of aircraft and the traffic volume gradually, and plans to open up international routes.
2. The company adheres to the corporate culture of efficient and quick, as well as the safety culture of positive and just.
3. The airlines regards safety as an important cornerstone of the development of the enterprise. It is one of the important tasks to ensure the safety of operation.
4. The state and the CAA have made clear requirements for the safe operation of the airlines and regard safety as the most important content of regulatory.
5. The public’s demand for safety is getting higher and higher.
6. The plateau routes that the airlines operates has high operational risk.

Through the above analysis, the following training should be carried out to the safety managers in order to achieve the goal of the company (Table 4).

Table 4. Results of organizational analysis

Training content	Courses
Organizational culture	–Company development planning –Corporate culture and safety culture –Company operation content and key risk
Industry status	–Development trend of civil aviation industry –Operation characteristics and main risks of civil aviation industry –Development trend of safety management in civil aviation industry –The development trend of the safety supervision of the CAA

4.2.2 Task Analysis

Through the analysis of the current tasks and future tasks of safety manager, and the typical event analysis and personnel interviews, the competency model of the job is determined, including (Table 5):

Table 5. Results of task analysis

Dimension	Elements
Professional knowledge	At least one of the following items: –Flight Operations (FLT) –Operational Control and Flight Dispatch (DSP) –Aircraft Engineering and Maintenance (MNT) –Cabin Operations (CAB) –Ground Handling Operations (GRH) –Cargo Operations (CGO) –Safety Management (SEC)
Safety management knowledge	–Laws and regulations related to safety –Safety management system and procedure –Safety planning –Risk management –Safety information management –Safety check –Safety performance management –Event investigation –Emergency rescue –Safety training and education –Large data analysis –Safety management based on IT technology –Mathematical modeling of safety management
Safety management capability	–Organize and coordinate multiple departments to carry out work –Smooth horizontal and vertical communication –Team management and team collaboration –Planning management and time management –Good oral and written expression
Safety management literacy	–Self-confidence –Strict, meticulous, but not rigid –Keep learning and accepting new things –Service consciousness –Execution –Bear pressure –Dare to challenge –Calm and impatient

4.2.3 Person Analysis

The airlines has a safety management department with 8 safety managers. Through the investigation and analysis of the basic situation of these safety managers, the differences between these personnel and the competency model are determined.

1. Professional knowledge. At present, each of the 8 safety managers all has at least one operation professional knowledge.
2. Safety management knowledge and experience. At present, 8 safety managers have most of the knowledge of safety management, but lack of experience in risk management,

safety inspection and event investigation. There is little understanding of the trend of safety management and the safety management based on IT technology.

3. Safety management ability. At present, 8 safety managers have insufficient ability to communicate horizontally, and have poor oral expression ability.
4. Safety management literacy. At present, 8 safety managers lack of continuous learning consciousness for new theories and methods of safety management, and can not learn new things voluntarily. And the ability to work under pressure needs to be improved.

In addition, in terms of personal training expectations, some people want to be trained in leadership and fine management.

4.2.4 Set up Training Courses for Safety Managers

Integrate the training content determined by the organizational analysis and the personnel analysis. It is ultimately determined that the 8 safety managers need to be trained as follows:

- Company development planning;
- Corporate culture and safety culture;
- Company operation content and key risk;
- Development trend of civil aviation industry;
- Operation characteristics and main risks of civil aviation industry;
- Development trend of safety management in civil aviation industry;
- The development trend of the safety supervision of the CAA;
- Practice and experience sharing of risk management;
- Practice and experience sharing of safety inspection;
- Practice and experience sharing of event investigation;
- The concept, method and tools of safety management based on IT technology;
- Effective communication and oral expression;
- Continue to learn;
- Stress relief;
- Leadership;
- Fine management.

5 Conclusion

Some conclusions are given as follows

1. Safety manager training is an important part of airlines safety management. But there is no systematic and comprehensive training demand analysis in airlines.
2. Based on the improved OTP model and the actual operation characteristics of airlines, the training demand analysis model for airlines safety managers is established.
3. Through the model, the analysis of training demand for airlines safety manager can be carried out, and the courses can be determined.

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