

Research on Evaluation System for Trial Operation of Urban Rail Transit

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Abstract

The evaluation of trial operation of urban rail transit is a decisive link of whether the new line of urban rail transit can put into trial operation. Whether the result of evaluation is objective, reasonable and effective has a direct relation with whether urban rail transit can ensure operation safety and satisfy the basic service requirements. Therefore, it is very important to make sure that evaluation is based strictly on standards for trial operation of urban rail transit. Based on the analysis of current situation of evaluation for trial operation of urban rail transit, this paper aims to construct evaluation system for trial operation of urban rail transit according to the its current deficiencies. It is proved that this evaluation system can make the result of evaluation objective, reasonable and effective.

Keywords: urban rail transit; trial operation; current evaluation situation; evaluation system

With the rapid development of urbanization, urban rail transit develops rapidly based on its advantages of high-capacity, speediness, punctuality, energy conservation and environment protection. Local government has formulated corresponding standards for trial operation of urban rail transit which fit in well with their features in order to help urban rail transit operation enterprise to put into trial operation smoothly. Because of urban rail transit is complicated system engineering consisted of many comprehensive technology, which leads to multitudes of evaluation standards of every system, such as *standards for trial operation of urban rail transit* in shanghai, only mechanical and electrical equipment system including 63 standards. It is no doubt a painstaking and difficult work for experts to finish evaluating according to so many evaluation standards in a such a short few days .The ignorance of any evaluation aspects will bring some hidden troubles to the following operation work of urban rail transit. Therefore, it is particularly important to explore and figure out an effective evaluation system for trial operation to make sure that the conditions of trial operation of urban rail transit enterprise can really comply with *standards for trial operation of urban rail transit* when trial operation evaluation is carried out.

1. Current Evaluation Situation of Urban Rail Transit Trial Operation

At present, governments delegate their power of urban rail transit trial operation evaluation to rail transit association. Generally, rail transit association organizes experts to conduct the evaluation and the result of evaluation will be reported to the competent department of the government [1]. The urban rail transit enterprise can not put into trial operation until the evaluation result is identified and approved by municipal government. Expert evaluation team must ensure operation safety and satisfy the basic service requirements through evaluating based on standards of trial operation. For the purpose of making full use of professional knowledge of different experts, expert evaluation team is divided into five groups: general group, civil engineering group, equipment group(1), equipment group(2) and trial operation preparation group[2]. (Figure 1)

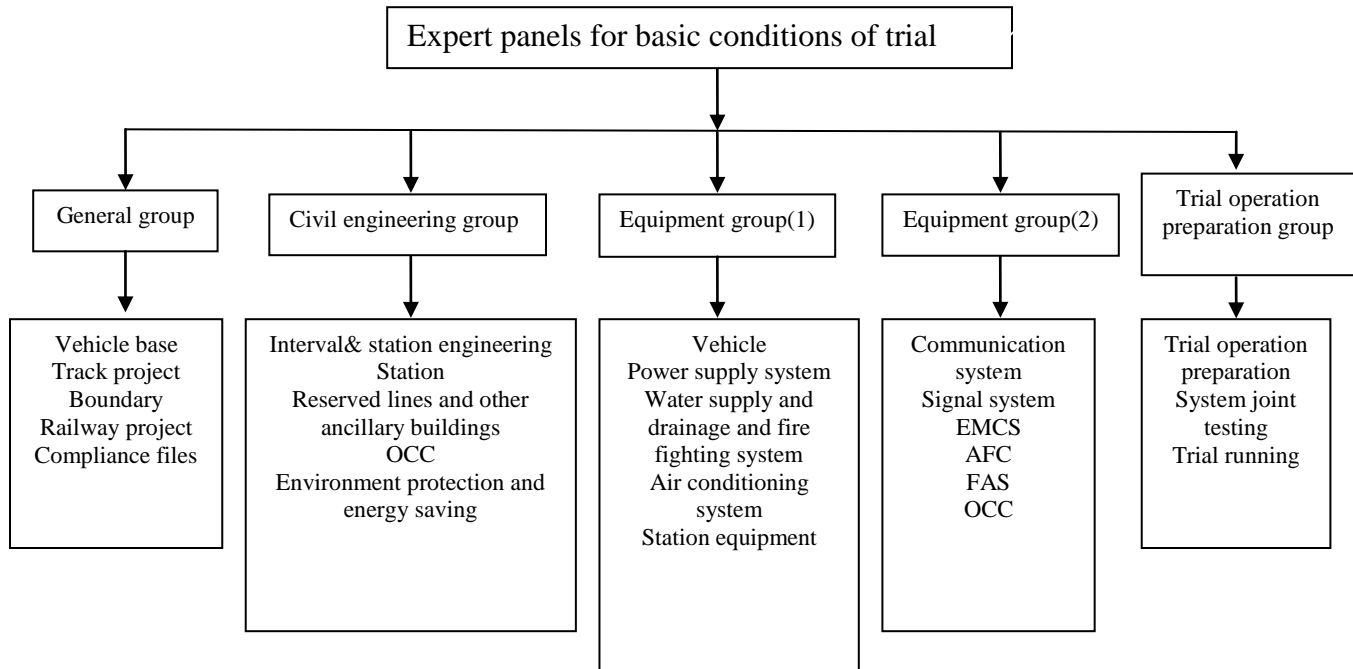


Figure1: Structure of Expert Panels for Basic Conditions of Trial Operation

1.1 Training before Trial Operation

In order to ensure urban rail transit trial operation being carried out smoothly, rail transit professional committee is supposed to conduct thematic training for experts from different fields. Training is mainly made up of preparation for evaluation date, specific procedure of evaluation, basis of evaluation and emphasis of evaluation, etc [2].

1.2 Trial Operation Evaluation

Urban rail transit will be put into trial operation after preliminary acceptance. Urban rail transit enterprise should apply to the municipal traffic administrative department for evaluation for basic conditions of trial operation. The municipal traffic administrative department is supposed to organize evaluation for basic conditions of trial operation in 30 working days after the application is put forward by urban rail transit enterprise [3]. Evaluation should analyze whether the new line consists with standard for trial operation and put emphasis on operation safety and basic service requirements. At present, evaluation for trial operation usually delegates the third-party to organize evaluation combined with self-evaluation by urban rail transit enterprise. The third-party must work in urban rail transit field, with independent corporate capacity. They must strictly abide by the laws, rules, regulations, technical standards and norms of the state and industry safety production and implement the evaluation requirements of new line to ensure the quality of evaluation. Experts who take part in evaluation for trial operation of urban rail transit should have senior professional and technical titles and rich practical experience. Furthermore, they must cover the majors of civil engineering, rail transit vehicles, power supply, communication, signal, environment control, water supply and drainage and fire fighting, electrical and mechanical equipments and operation management, etc. Professionals of the third party should not have interest relationship with urban rail transit enterprise, besides experts from other place should be more than 50 percent of the total. The procedure of evaluation should include listening to the report, checking date, scene investigation, spot check system testing, summary discussion and submitting evaluation report [4].

1.2.1 Listening to Report

First, experts in urban rail transit field should listen to the report about engineering construction, operation preparation [5-6](Figure2) and public transport interchange of the new line which is held by urban rail transit enterprise so as to know about the situation of trial operation work in detail.

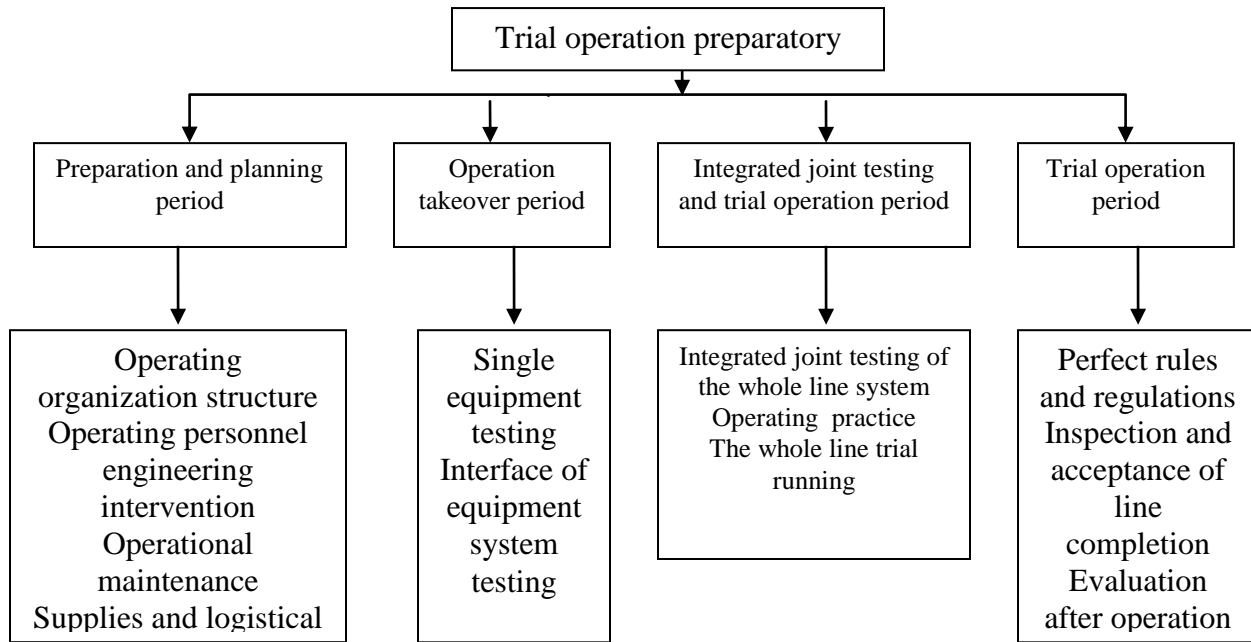


Figure 2: Preparation for Trial Operation Period

1.2.2 Checking Date

After listening to the report held by urban rail transit enterprise about basic situation of the trial operation new line, experts will check some necessary documents which are indispensable for the urban rail transit new line to put into trial operation. These indispensable documents are mainly including approval documents of planning and construction, license documents of engineering and construction, acceptance documents of the quality of project, acceptance documents of the quality of driving and service equipment, acceptance documents of the quality of special equipment, acceptance documents of firefighting, safety inspection documents acceptance documents of civil air defense, sanitation assessment document, acceptance documents of environment protection, acceptance documents of grounding for lightning, fare approval document, file approval document and other approval documents.

1.2.3 Scene Investigation

In the course of scene investigation, expert panels are divided into five groups(Figure 1).They are assigned to test the performance of the trains of urban rail transit new lines which is going to be put it trial operation. After the train test, expert panels go to the operating control center, main substation, vehicle depot, some stations and intervals to do some scene investigation, inspecting the quality of engineering construction and the supporting facilities and equipments.

1.2.4 Spot Check System Testing

After the scene investigation, expert panels from the third-party will go to the process of spot check system testing including vehicle, power supply, communication, signal, FAS and EMCS, which is based on *standards for trial operation of urban rail transit*.

1.2.5 Summary and Discussion

Expert panels will summarize and discuss the problems which are found in the process of listening to the report, checking date and scene investigation. Meanwhile, they have the responsibility to put forward rectification opinions for civil engineering, equipments, preparation for trial operation.

1.2.6 Submitting Evaluation Report

The result of summary and discussion will be handed in to the municipal traffic administrative department in the form of written report. Then the municipal traffic administrative department will rectify the report according to the opinions of expert panels. Urban rail transit enterprise have to carry out the rectified report.

The third-party reviews the implementation situation of rectification project and submits the review report. After the rectification is finished under the supervision of the municipal traffic administrative department, urban rail transit enterprise can put the new line into trial operation.

2. Deficiencies of Evaluation for Trial Operation of Urban Rail Transit

The process of evaluation for trial operation of urban rail transit uses the approach called brainstorming which forms the collective opinions based on which the decision is made [7]. Expert panels from different field of urban rail transit industry come up with the final collective evaluation opinions by the way of listening to the report, checking date, scene investigation, spot check system testing, summary and discussion and submitting evaluation report.

According to present procedure of evaluation for trial operation of urban rail transit, there mainly exist three deficiencies: incomplete information, difficult evaluation, responsibility hard to investigate[8].

2.1 Incomplete Information

Take shanghai for example, the evaluation for trial operation conference usually lasts for 3 days when the length of new line is less than 20 kilometers , more than 20 kilometers lasting for 4~5 days. In such a short time, expert panels mainly know about the new line through listening to the report, checking date, scene investigation and spot check system testing, however, the information from them are usually incomplete. It is no doubt that incomplete information is one of the deficiencies of the present evaluation procedure.

2.2 Difficult Evaluation

Urban rail transit industry has a close relation with rail, vehicle, power supply and signal, etc. Multidisciplinary blend make the evaluation for trial operation expand both in profundity and breadth. Urban rail transit construction based on multidisciplinary theory no doubt puts forward higher requirement on evaluation in turn. Therefore, the difficult of evaluation is increased. Although evaluation experts have high attainments and rich experience in their own field, it is hard to avoid cognitive blind spots owing to incomplete information. At the same time, the limited time of evaluation conference makes experts have not enough time to check the supplied dates carefully which directly causes them can not make correct judgment and elaborate their evaluation opinions. In the course of listening to report, the inappropriate presentation skill and the incomplete content of the report will also have a great influence on the result of evaluation. Incomplete information and one-sided cognition with limited time often lead to inaccurate and incomplete results of evaluation.

2.3 Responsibility hard to Investigate

Incomplete information and difficult evaluation lead to responsibility hard to investigate. Because of the limitations of the present evaluation approach, experts need not undertake full responsibility even though the results of evaluation are inaccurate and incomplete. In real evaluation, the reasonable experts may first give the statement that they do not know much about the situation and their opinions voiced are for reference only. In evaluation content, most experts are inclined to refer to the field they are familiar with and problems they ascertain. They may even deviate from the problems of evaluation and just talk about their own perspectives in order to get rid of their technical responsibilities which they are supposed to undertake.

3. Establishment of Evaluation System for Trial Operation of Urban Rail Transit

From the current deficiencies of evaluation for trial operation of urban rail transit, we come to conclusion that deficiencies of evaluation for trial operation of urban rail transit consist not in invalidation of experts' function but in inappropriate utilization of experts' function. Therefore, establishment of new evaluation system are supposed to be scientific understanding and accurate positioning of experts' function in order to make best use of professional knowledge and rich experience of every expert. As the elite in various fields, experts are not good at collecting the basic information of the new line and checking various dates. Therefore, it is necessary that we divide the work of current evaluation reasonably. This paper introduces evaluation unit that has a comprehensive technical analysis and evaluation competence in evaluation system for trial operation of urban rail transit. The evaluation unit is provided with plenty of time, information and capital that can ensure the evaluation to be carried out smoothly. Meanwhile, evaluation experts are able to break away from specific technical audit which can make them focus their attention on analysis and evaluation of important problems. This evaluation system introduces a professional evaluation unit based on construction and operation unit of urban rail transit.

Professional evaluation unit functioning as a bridge which connects evaluation experts with construction and operation unit of urban rail transit can finish early stage work of evaluation and undertake basic responsibility of technical evaluation. Professional evaluation unit not only can be professional evaluation company that has corresponding professional competence but also can evolve from construction and operation unit of urban rail transit directly. Based on *standards for trial operation of urban rail transit* and necessary investigation and research, evaluation unit gives a comprehensive and detailed inspection and analysis of urban rail transit new line in technical level in order to form reasonable evaluation opinions that is comprehensive and clear. The evaluation opinions obtained from professional evaluation unit will be reported to evaluation experts. Evaluation experts acting as the final decision makers will make a comprehensive analysis and form a collective judgment according to technical evaluation opinions. The specific content of this evaluation system is shown below. (Figure 3)

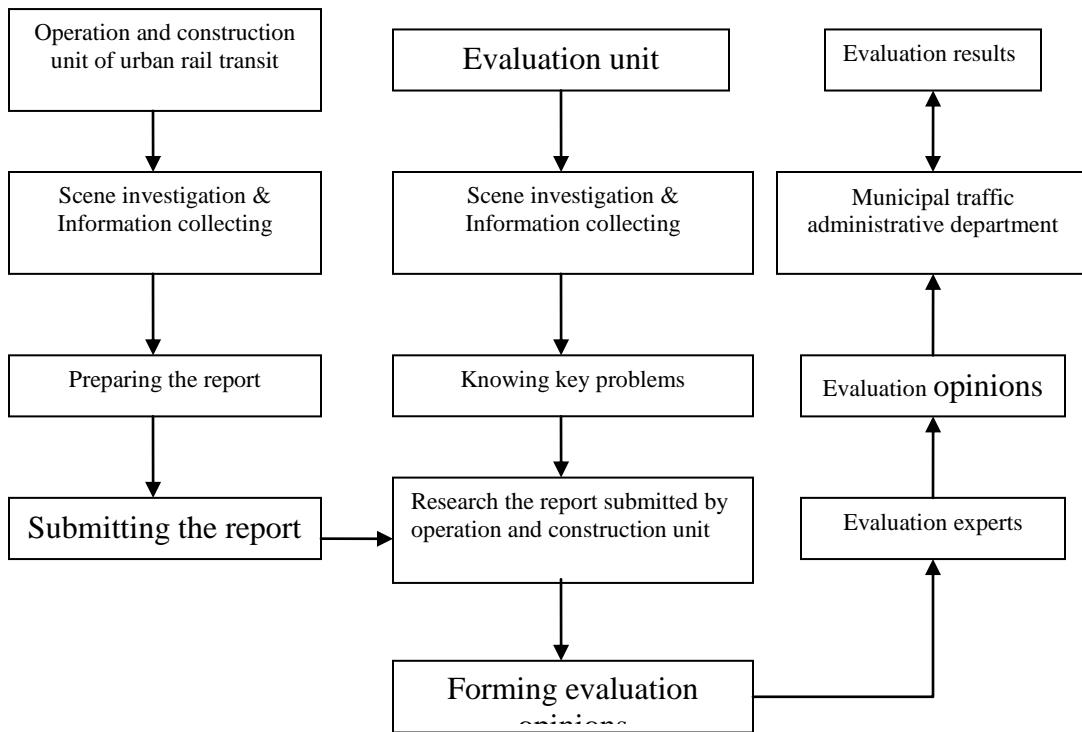


Figure 3: Evaluation System for Trial Operation of Urban Rail Transit

4. Conclusion

This paper has established evaluation system for trial operation of urban rail transit based on analysis on current situation of evaluation for trial operation of urban rail transit. This evaluation system effectively overcomes the deficiencies of incomplete information, difficult evaluation and responsibility hard to investigate in current procedure of evaluation. The introduction of evaluation unit makes the experts free from checking basic dates and specific technical audit, so the abundant knowledge and experience of every expert can be made best uses of. Further division of evaluation main body enables the evaluation unit and evaluation experts to take full advantage of their own superiority and undertake their own responsibilities respectively, which is bound to greatly enhance the efficiency and effectiveness of evaluation for trial operation of urban rail transit.

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