Feature

Activities of Japan's Aircraft and Railway Accidents Investigation Commission

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Introduction

The Aircraft and Railway Accidents Investigation Commission (ARAIC) was officially established on 1 October 2001 after the national legislation governing the activities of the earlier Aircraft Accident Investigation Commission (AAIC) was revised in April 2001 to create a new standing commission that would also have responsibility for investigating railway accidents. Hitherto, fair and impartial investigation of accidents in the public aviation, marine and road transport sectors was performed by the above mentioned AAIC, the Marine Accidents Inquiry Agency, and the Institute for Traffic Accident Research and Data Analysis, respectively. The move in favour of forming an organization for investigation of railway accidents increased after the May 1991 accident on the Shigaraki Kogen Railway and was given more concrete impetus following the March 2000 accident in Tokyo on the Teito Rapid Transit Authority's (TRTA) Hibiya Line.

The Railway Sub-committee of ARAIC is charged with scientific investigation of railway accidents and serious incidents (simply called accidents in the rest of this article), submission of reports on accidents based on the result of the investigation to the Minister of Land, Infrastructure and Transport, publication of these reports, and issuing of recommendations and proposals based on the report findings to railway operators to prevent recurrence of accidents due to the same causes. It is also responsible for carrying out testing and research into railway accidents and incidents with potential for causing an accident. However, the purpose of the investigation is not to assign blame or conduct judicial inquiries.

The ARAIC is chartered by a special law as an independent standing commission of the Ministry of Land, Infrastructure and Transport (MLIT) based on Article 8 of the National Administrative Organization Law. The Commission's investigations are performed under the jurisdiction of the ARAIC Chairman and commission members and accident investigators ARAIC supported by staff of the regional transportation bureau under the jurisdiction of the Minister of Land, Infrastructure and Transport.

This article describes ARAIC and its railway accident investigation activities.

JR West's special train from Osaka and Shigaraki Kogen Railway's DMU train collided head-on, killing 42 people (14 May 1991). (*Transportation News*)

Historical Background to ARAIC Establishment

Until the October 2001 establishment of the ARAIC, its predecessor, AAIC was charged with responsibility for investigating aviation accidents. The AAIC had been established based on the Law to Establish the Air Accidents Investigation Commission passed by the Japanese Diet in 1974 following two recent aviation accidents at Shizukuishi and Yokotsudake to establish a full-time investigation commission to improve difficulties caused by a temporary commission. The AAIC followed the regulations, standards, methods and processes of the Internationsl Civil Aviation Organization (ICAO) to investigate aviation accidents.

The ARAIC started its work from 1 October 2001 after the above law was revised as the Law to Establish the Air and Railway Accidents Investigation Commission.

The most serious railway accident after the 1987 privatization and division of JNR occurred on 14 May 1991 in Shigaraki Town on the Shigaraki Kogen Railway, killing 42 people and injuring 614. The Railroad Safety Promotion Conference formed after the accident by the families of the victims and their supporters recommended establishment of a fair and impartial organization along the lines of similar organizations in several other countries. Some of the details of the Conference can be found at http://www.tasksafety.org. In November 1998, the findings of the Council for Transport Technology of then

Ministry of Transport (now MLIT) proposed the need for a national independent, fair and impartial body separate from railway operators to investigate, analyze and clarify the causes of railway accidents. The report was accepted and it was agreed in June 1999 that when either a railway accident causing five or more deaths or 20 or more serious injuries or when an unusual accident with hard-to-clarify causes occurred, the Director General of the Ministry of Transport's Railway Bureau would convene a Railway Accident Investigation Working Group in a closed hearing. This group had no judicial powers and it was only first convened as part of the investigation into the fatal accident on the TRTA's Hibiya Line in Tokyo in March 2000. Furthermore, in the interim report into the accident, the group's chairman expressed a number of recommendations outlined below:

- To facilitate urgent investigation at an accident, accumulation of accident-related know-how and data, and continuity of accident investigation, it is necessary to establish a permanent and specialized investigation system that can conduct specialized accident investigations along with a system to prevent recurrence of accidents due to similar causes.
- To assure smooth investigations of accidents, it must be possible to collect and hold accident-related data and items.
- Fundamental R&D into railway accidents must be promoted.

These recommendations were accepted and the Railway Section of the Council for Transport Technology proposed conducting railway accident investigations along the lines of the recommendations. The new law was promulgated based on this proposal.

TRTA's Hibiya Line train derailed and was hit by on-coming train, killing five people (8 March 2000). (MLIT)

Purpose and Legal Aims of ARAIC

The purpose of the ARAIC is to:

- Investigate the causes of aviation and railway accidents
- Investigate the causes of serious aviation and railway incidents
- Write and publish investigation reports
- Make recommendations and proposals based on the investigation reports
- Perform basic research into and studies of accident causes

Before the revision of the ARAIC legal charter, under the old system, the AAIC investigated only aviation accidents and incidents but the revised legislation added investigation of railway accidents as well.

The legal characteristics of the ARAIC are:

- Independence
  The Commission's legal charter says that its Chairman and members shall have independent authority. Based on this, when passing resolutions regarding recommendations of accident investigation reports, etc., the Chairman and members each have one vote of equal weight. Moreover, to prevent the recurrence of accidents, the ARAIC has the right to submit reports and to make recommendations and proposals to the Minister of land, Infrastructure and Transport and the heads of related government organizations.
- Fairness and Impartiality
  Under the law, members of the ARAIC may not be employees of railway operators or railway-related manufacturers, etc. Furthermore, voting on Commission resolutions must be decided by a majority of more than 50%. The fairness and impartiality of the Commission must be guaranteed by listening to the opinions of persons related to the

causes of the accident, by holding hearings, and by including minority opinions in reports. Moreover, both Houses of the Japanese Diet must approve the appointment of the Commission Chairman and members.

- Specialty
  Nominations for Commission members must be based on candidates' ability to provide scientific and impartial judgments. In addition, special technical advisers may be appointed as necessary to assist with accident investigation.
- Permanence
  In addition to appointment of full-time Commission members, the legislation also provides for establishment of a permanent Secretariat that is subordinate to the Commission for the purpose of supporting the work of the Commission. The Secretariat takes its orders from the ARAIC Chairman and is composed of a General Director, aviation and railway accident investigators, along with other administrative staff.

Relationship between ARAIC and MLIT

When the charter legislation was being discussed, there was a general opinion in favour of the need to establish the ARAIC as a national body with a high degree of independence (a Commission under the terms of Article 3 of the National Administrative Organization Law). The intent was to create a national organization along similar lines to the National Transport Safety Board (NTSB) in the USA.

However, ultimately, the revised legislation created the ARAIC as part of the present MLIT. The reason was because the ARAIC is an organization that achieves its purpose through scientific discussion—quasi-legislative or a quasi-judicial functions are not necessarily required (unlike the very powerful Fair Trade Commission). The ARAIC was established in Japan as a fair and impartial body for investigating railway accidents and was modelled after the NTSB, which was similarly first established under the US Department of Transport.

The ARAIC is authorized by law to perform accident investigations independently of the MLIT. However, the ARAIC's investigations are performed in close contact with the MLIT and its regional transportation bureaus. In concrete terms, when a railway accident occurs, the railway operator is compelled by law to notify the Railway Division of the regional transportation bureau which notifies the Railway Bureau of MLIT which in turn notifies the relevant investigation section at ARAIC. Staff of the MLIT regional transportation bureau are dispatched to the accident site to check the accident status, liaise with the ARAIC's supervising investigator and prepare for and support the ARAIC's on-site investigation.

Railway Accident Investigation System and Objectives

The ARAIC's accident investigation systems since the revision of its charter are outlined in Figure 1.

The Commission is composed of one Chairman and nine members; the Chairman and five of the members are full-time employees while the other four members are part-time. The Secretariat has a total of 41 staff; the accident investigations are headed by an Aircraft Accident Investigator General and a Railway Accident Investigator General. The former has three Deputy-Chief Accident Investigators and 18 Aircraft Accident Investigators. The latter has five Railway Accident Investigators.

The Commission has the authority to form sub-committees; the current Railway Sub-committee is composed of the Chairman, sub-committee Chairman, two full-time members and two part-time members. The Railway Sub-committee does not examine major accidents, but instead discusses investigations into the causes of accidents, and passes resolutions on accident reports, proposals and recommendations. The Commission's rules define an accident as major when the number of fatalities or missing persons is 10 or more, or when the number of fatalities and seriously injured is 20 or more. In the case of a major accident, the Commission Chairman and members discuss and pass resolutions on the accident. However, there has not been a major railway accident since the legal revisions, so this latter system has yet to be implemented.

The number of annual railway accidents in Japan is about 800. Of these, most have clear causes and the countermeasures are also quite clear. Table 1 shows the railway accidents targeted for investigation by the Railway Accident Investigators in accordance with the ministerial ordinances.

From this table, it is clear that the targets of investigations include all railway collisions, derailments and fires with the potential to cause death or injury to passengers and damage to property. Other accidents (categories 4 to 7) may be the subject of investigation depending on the scale of damage.

Serious incidents (near misses) are investigated based on reports from railway operators and the investigation contents are listed in Table 2.

The Commission is authorized by law to conduct the following procedures as part of the investigation:

- To take reports from related parties
- To inspect the accident site and related items, and to question related parties under oath
- To request attendance of related parties at hearings

- To request submission and storage of accident-related materials
- To order preservation and impoundment of accident-related items
- To prohibit entrance to accident site by people not on official duty

However, these procedures are not binding on criminal investigations.

Conductance of Investigations into Railway Accidents

When a railway accident occurs, the railway or tramway operator immediately notifies the regional transportation bureau in accordance with the ministerial ordinance governing railway accident reports. The facts of the accident are passed via the Railway Bureau and Safety Affairs Office of MLIT to ARAIC. On receiving the accident notification, ARAIC immediately appoints an investigator in charge and commences preparations for investigating the accident and liaison with relevant authorities such as the National Police Agency.

The actual investigation of the accident will involve on-site inspection of the railway infrastructure and rolling stock, collection of items and materials related to the accident, collection of related data, such as drawings, sketch maps, meteorological reports, etc., collection of verbal statements from passengers, train crew, railway employees related to the accident, performance of required tests and research, and analysis of data.

The investigation results are summarized as an accident investigation report for deliberation by the ARAIC Railway Sub-committee. When necessary, hearings are held to obtain the opinions of both parties related to the accident and of expert witnesses to clarify the facts of the accident. The Commission finally votes to accept the report, which is then submitted to the Minister of MLIT and made public.

When separate measures are needed to prevent recurrence of the accident, the Commission may issue recommendations, proposals and opinions. Recommendations to the Minister, the Commission confirms the results by requesting the Minister to report on the actual countermeasures taken. Proposals do not require ministerial

Figure 1 Organization Chart of ARAIC

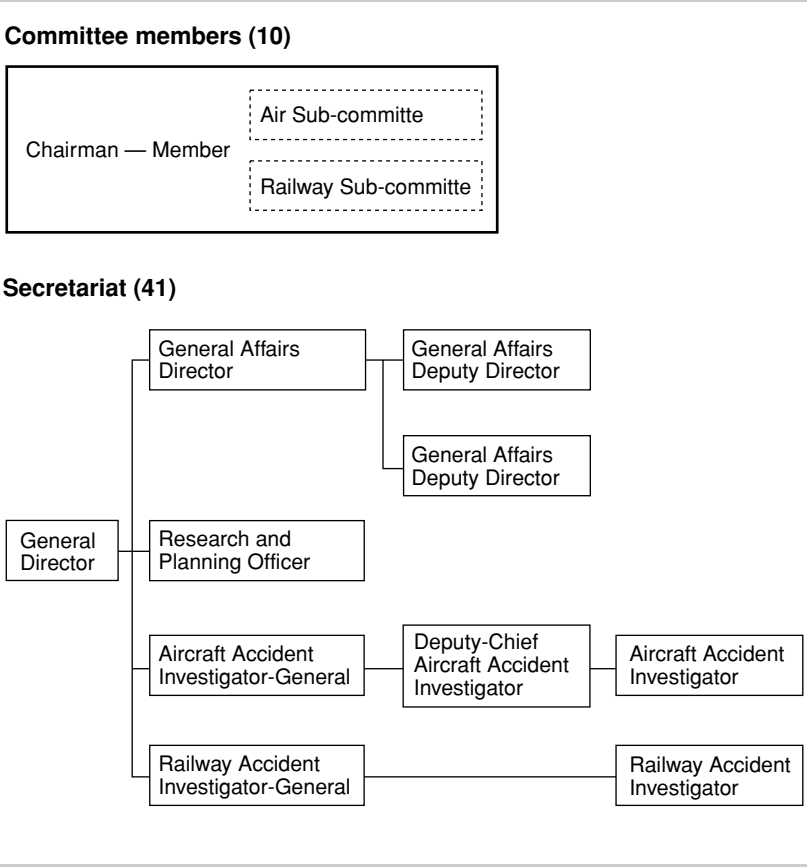


Table 1 Railway Accidents Investigated by ARAIC

Report Target (MLIT Railway Accident Report Rule)	Investigation Target Selected from Report Targets by MLIT Ordinance
1. Train collision 2. Train derailment 3. Train fire	Same as left
4. Level-crossing accident 5. Collision or contact with people or vehicles on roads, excluding level crossings 6. Deaths or injuries 7. Property damages of ¥5 million or more	In accidents 4 to 7, any of the following: • Accident causing death to passengers or staff • Accident causing 5 or more fatalities or injuries • Especially unusual accidents

Table 2 Serious Railway Incidents Investigated by ARAIC

Report Target (MLIT Railway Accident Report Rule)	Investigation Target Selected from Report Targets by MLIT Ordinance
1. Entry of train into block section before completion of block section closure	• Presence of other train or rolling stock in closed block section • Especially unusual incidents
2. Signal aspects indicating OK to proceed even when problems ahead or problems ahead occurred while signal aspect showing OK to proceed	• Entry of train into ahead section • Especially unusual incidents
3. Train violating stop signal aspect interfering with routes of other trains or rolling stock on main line	• Entry of other train or rolling stock into closed block section • Especially unusual incidents
4. Runaway of train or rolling stock between stations	• Especially unusual incidents
5. Entry of train or rolling stock into section closed for maintenance or works	• Especially unusual incidents
6. Derailments shown below: • On main line • On sidings that interfere with main line operations • On sidings but caused by factors or operations not unique to sidings	• Especially unusual incidents
7. Damage to, faults in or destruction of track or safety equipment, possibly affecting safe train operation	• With danger risks for train collision, derailment or fire • Especially unusual incidents
8. Damage to, faults in or destruction of rolling-stock running equipment, braking equipment, electrical equipment, couplers, safety equipment, etc., possibly affecting safe train operation	• With danger risks for train collision, derailment or fire • Especially unusual incidents
9. Abnormal leaks of dangerous or flammable materials from trains and rolling stock	• Especially unusual incidents
10. Other similarly serious incidents not covered by 1 to 9 above	

feedback but the Commission carefully observes the status of countermeasures. Opinions are relatively lightweight but to promote their adoption they are included in the Commission's reports.

Very few official reports on railway accidents have been published since the JNR division and privatization in 1987 because there was no legal obligation. However, any future accidents investigated by ARAIC will be publicly reported.

Railway Accident Investigations

Since its inauguration, ARAIC has investigated a total of 23 railway accidents and two major incidents (category 2). Reports have been made public for seven of these accidents and the two incidents. They can be easily accessed at http://www.mlit.go.jp/araic/railway/report.html. The remaining reports will be published in due course.

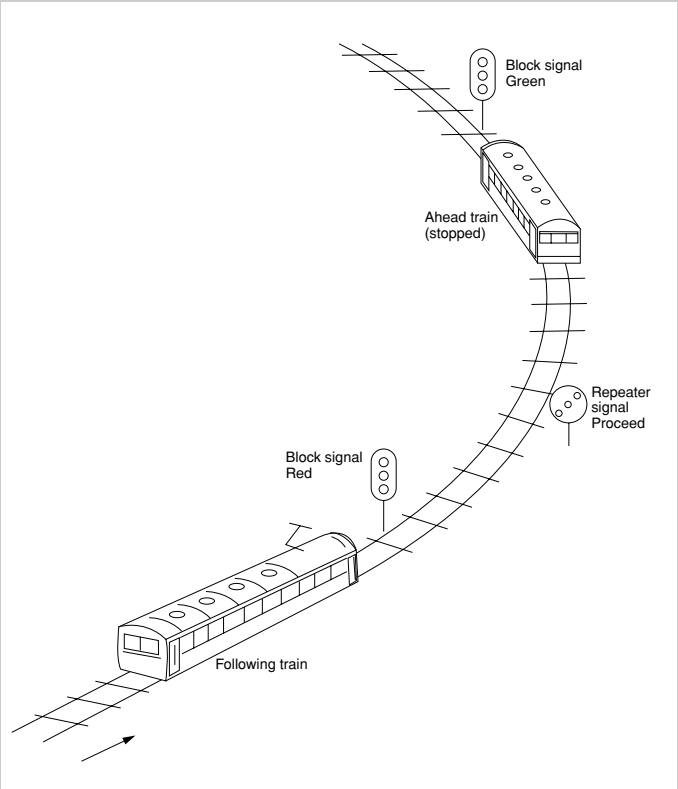
The 23 investigated railway accidents included one train collision, 17 derailments, two train fires, two level-crossing accidents, and one accident causing damage to property. The two serious incidents both involved signal violations. An accident that deserves special mention is the train collision that occurred on the Kagoshima main line of JR Kyushu on 22 February 2002. Nobody was killed but more than 130 passengers and train crew were injured. This accident occurred because the train was stopped for examination when an unusual noise was heard while the train was running and a following train ran into the back of the stopped train (Fig. 2). The accident investigation showed that the ahead train had stopped at the end of a curve in a block section between the signal closing the ahead block section and its repeater signal; the following train stopped for 1 minute at the stop aspect of the signal closing the block section in which the ahead train had stopped, but then proceeded with caution past the stop aspect based on the regulations allowing non-blocking operation. However, since the repeater signal linked to the signal closing the ahead block section was showing the proceed aspect, the driver started accelerating and suddenly ran into the back of stopped ahead train.

In addition to publishing an interim report into this accident on 26 April 2002, ARAIC also published some proposals related to safety countermeasures for non-blocking operation and to designing crashproofness into rolling stock. These proposals were the first to be related to an accident investigation by the ARAIC.

Conclusion

The ARAIC started work on 1 October 2001 as an organization for providing fair and impartial investigation of railway

Figure 2 Diagram of Accident on 22 February 2002 on Kagoshima main line



JR Kyushu's local train collided with the following rapid train on Kagoshima main line while stopping for examination (22 February 2002). (MLIT)

accidents in Japan. It is broadly comparable to the NTSB in the USA in terms of its brief but is somewhat smaller in terms of scale. For example, the NTSB has somewhere around 400 employees and an annual budget of about $70 million whereas the ARAIC has 51 staff and a budget of about $1 million.

In addition, the NTSB investigates about 500 railway accidents each year and publishes reports into about five of these accidents. In the case of Japan, ARAIC expects to publish 20 to 30 reports into the 800 or so annual railway accidents.

Prior to 1 October 2001, railway accidents were investigated by the Railway Accident Investigation Working Group, which was an advisory organ to the Director General of the Railway Bureau of the former Ministry of Transport. At the establishment of ARAIC, suggestions were received from the previous staff of the working group about assuring timely publication of accident information overseas as well as in Japan. Although the primary function of the ARAIC is to provide fair and impartial investigations into aviation and railway accidents in Japan, it is also intent on facilitating international distribution of information about the circumstances of transport accidents in Japan to help prevent accidents worldwide. I hope this article goes someway to fulfilling the latter objective. ■

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