

# Disaster Preventions in the Time of Emergency and Social Role and Responsibility of the Railway Workers

**Akinori Yanagi**

**Planning Director of Head Office**

**East Japan Railway Workers Union (JREU)**



## **SUMMARY**

This paper examines disaster preventions in the time of emergency and social role and responsibility of the railway workers. It is important that the company should fulfill the social role such as; to have a secured means of communication, to eradicate dangerous spots and to set up counter-disaster measurements. We discuss the main points which we discovered from the survey and propose the ways of how to deal with emergency such as huge earthquake and tsunami.

## **INTRODUCTION**

On March 11th 2011, magnitude 9.0, Great East Japan Earthquake struck eastern Japan and it caused unbelievably huge tsunami resulted in deaths of approximately 19,000 people and destroyed the lives of many people. Also, the damage and the influence by the accident at the Fukushima nuclear power plant still continue and the abolishment work of the crippled power plant such as pulling out of fuel rods will take decades. The Fukushima nuclear accident terrifies the world.

Five East Japan Railway Company (JR East) employees, seven employees from affiliated companies lost their lives and two are still missing. In addition, more than 1,100 cases of total destruction, partial destruction or washed away of houses are recorded. As for railway damages, the facilities of Shinkansen (Bullet Train) and other 7 lines were nearly total collapsed.

However, nobody was injured or dead on the trains which were in service when earthquake hit. We believe that this can be called "Miracle". After we conducted a survey to collect talks and experiences of union members about this "Once in 1,000 years earthquake", we reached a conclusion that this miracle was not made by chance, but it was made inevitably. In other words, pre-measurements in both ways, machinery and workers were well prepared. However, more than that, the union members made accurate judgements in the face of situations that were beyond drills or manuals.

Why were they able to make such decisions? We conducted the survey and gathered the lessons learned from the disaster. They have to be passed on to the next generations and this passing of lessons is necessary to establish a safety philosophy of the railways. Therefore, we distributed a questionnaire to 11,827 union members, approximately 25% of total union members. As a result, 11,217 answered, which was 95% returns and we examined this highly valuable survey results. Therefore, we would like to present our counter-disaster measures and education which can be seen from questionnaire in this paper.

## **A PROBLEM THAT IT WAS DIFFICULT TO SECURE A MEANS OF COMMUNICATION WITH THE CONTROL CENTRE AFTER THE EARTHQUAKE**

The questionnaire asked, how quickly did you have a secured communication with the control centre? The answers from the sales department at stations said, 60.7% "immediately", 16.5% "within 1 to 2 hours". 6.4% "within 12 hours". 8.2% "not on the day". 6% "2 to 3 days". 2.2% others.

Drivers department replied 50.1% "immediately". 24.5% "within 1 to 2 hours". 8.9% "within 12 hours". 11% "not on the day". 1.8% "2 to 3 days". 3.7% others.

Facility department such as maintenance and electricity answered, 38.1% "immediately". 24.8% "within 1 to 2 hours". 12.6% "within 12 hours". 13.2% "not on the day". 3.5% "2 to 3 days". 7.8% others.

Different departments show different numbers. Needless to say, it is important to have a secured communication for safe evacuation and safety driving. Nonetheless, those who answered "immediately" was 60.7% of sales department, 50.1% of drivers department, 38.1% of facility department. Thus, the average number is below 50%. This number is far too low, given the fact that train driving is managed by the orders of control centre. In addition, because of incredible damages, it is impossible to give appropriate orders and instructions to all work-sites by the control centre. The reality is that more than 24 hours, a ways of communication were out of order. Thus, it is essential to secure other means of communication as well as giving a priority to the decisions by the field workers.

The questionnaire asked a means of obtaining information about earthquake and tsunami on the day of the earthquake. 28.3% replied "information from the company". 77.9% "TV". 25.2% "radio". 23.9% "the Internet". 2.4% "wireless information by the local government". 5.5% others.

Because of multi answers, they can be overlapped, but the results seem to indicate that workers try to access the information on their own, because information from the company is not enough. These behaviours reflect the importance of information in the modern society. We need to examine the future framework of how to obtain accurate information in the time of emergency.

## **A PROBLEM WHICH THE MANUALS WERE NOT EFFECTIVE AT ALL**

Please see the results of questionnaires, "Do you have manuals for a large scale earthquake?" Only a quarter of respondents (24.5%) replied that they always keep them at hands. 44.7% said that they have manuals at home. 23.7% answered that they were not sure they received them or not. 6.2% said that manuals were not distributed. 0.09% checked others. From the answers, most do not have the manuals at hands.

Next question is that how did you use manuals when an earthquake hits. 3.1% answered "Fully used" and 10.3% answered "Used". This means that only 13.4 % used the manuals. 29.2% did not use them much. 49.4% did not use them at all. 6.7% did not know them at all. 1.3% said others. According to the survey, more than 85% did not use the manuals.

Next question is about education on earthquake manuals. 19.6% said they had lessons and understood the content clearly. 42.1% answered they had lessons but the understanding of the content was not enough. 7.6% said lessons were provided but did not attend them. 29.2% replied that there was no education. 0.15% replied others. This means that approximately 80% of those who answered the questionnaire did not understand the education.

Results showed that 60% people had education and the rest of 40% did not have education. In addition, even that 60% who had education, understood its content only 20%. This indicated that education itself was merely a formality.

The main reason why they do not have education is that because they are busy. If so, it is important to give sufficient time of education for workers. Furthermore, the survey revealed that there were no professional instructors on that kind of education. Since a natural disaster, which is beyond imagination can occur, practical drills are indispensable to prepare for saving lives.

Moreover, most respondents answered that it was critically important to set up a framework giving a priority to decisions by the field workers. At the same time, a framework is needed even if the decision is wrong, the responsibility should not be put on an individual who made decisions.

## **A PROBLEM THAT EVACUATION PROCEDURES, WHICH WERE PRACTISED AT OFFICE WERE NOT EFFECTIVE**

Regarding a question about evacuation procedures, survey results showed that 26.2% said procedures were clear. 32.4% said not clear enough. 22% answered unclear. 18.6% said not sure. 0.08% said others. This means that 70% respondents do not understand the evacuation procedures.

Next question is about evacuation sites. 32.9% said the manuals were clear. 25.2% said they were not clear enough. 21.4% answered that they were unclear. 19.7% said they did not know. 0.08 answered others. Also, this question revealed about 70% were not sure about evacuation sites.

Next question asked, "Did you evacuate to an evacuation site from your working place after the earthquake occurred?" 18% answered that they evacuated by instructions. 13% replied that they evacuated on their own decisions. Totally combined, 31% respondents evacuated. However, this number is mostly from those who work in a group as office workers at the head office or branch offices.

On the other hand, 2.2% said that they did not evacuate even after orders were issued. 59.8% did not evacuate because there were no orders. 0.7% said others. This means that field workers show a lower tendency of an actual evacuation.

Apart from drivers at work and maintenance workers on the ground, workers at stations, where many passengers were, could not evacuate even after they were ordered to do so. Also, they could not evacuate leaving others behind. In addition, some did not understand the evacuation site. In the worst case, some evacuation sites were hit by tsunami and they were not suitable for evacuation sites. In particular, when a train driver got off the train, most likely he did not know where he was. Thus, although education had been carried out to workers, it was not practical enough. This problem has to be overcome.

## **REPORTING REAL VOICES OF JR EAST WORKERS WHO CONTRIBUTED TO THE ZERO VICTIMS IN THIS DISASTER**

The first case is a story by a train driver who escaped from tsunami on Ofunato line when earthquake struck. The driver was instructed to evacuate to Ofunato elementary school by the control centre. He ordered the people on the train to get off and began to guide them to a higher ground. He told them "We are going to Ofunato elementary school" but a passenger said, "The school is situated in a lower ground than here. Ofunato junior high school is on a higher ground and should be safer"

The driver was aware of that fact and he guided everyone to Ofunato junior high school. At the end of the day, the junior high school was safe, but the elementary school was washed away by the tsunami. This successful case is a result of following an opinion by a local passenger than an order by the control centre. Because of listening to a local passenger, everyone was safe.

However, from the viewpoint of control centre, this case violates the order of the centre. At the same time, the centre has a limitation and they cannot give correct orders always. So, this clearly shows that judgements by a field worker on the spot are crucially important. This is a successful case but the opposite case can happen.

What if they escaped to the junior high school and were hit by tsunami? The driver could be charged by a violation of the order and punished for his action. Thus, it is important to give a priority to the “on the spot decisions” than orders by the control centre. And even if that decision is wrong, a responsibility should not be placed on the workers. In other words, courage of driver should be praised.

Second is a case which we made a presentation last year. A driver and a conductor were hit by tsunami at Shinchi station on Joban line and they had no communication with a station or a control centre. There were two policemen coincidentally on the train and they guided passengers to a safe place after they received a tsunami warning.

However, the driver and the conductor did not leave the train because they had an obligation to watch the train. They did not think that tsunami would reach that far since the station is 500 meter away from the seashore. However, the tsunami washed up the station, so they rushed to the top of the station bridge and spent a night over there.

This is the train they rode. The train car struck the bridge and it became L letter-shaped. This is the bridge which they spent a night. Tsunami came up to the foot. What we have to think is, why they did not run away with policemen and passengers? It was because, they had to carry out their duties. At the same time, they did not have any access to information on how to deal with earthquake and tsunami.

Third case is at Kurihama. After a train left the station, the earthquake occurred and it stopped with an emergency brake. The driver saw the warning of huge tsunami on a road display which was next to the railway. The evacuation order had been issued and the control centre ordered to prepare for evacuation.

The passengers on the train were panic. The driver and the conductor looked for a ladder for passengers to ride off the train, but they thought the ladder was not strong enough to support them. Thus, they opened the doors and removed the train chairs. They threw the chairs outside and piled them up as an emergency ladder asking passengers to jump off from the train. They carried elders to help them get off the train. It took too much time, so they asked two policemen working on the road guiding cars to help them getting the passengers off. Among passengers, there was a local resident who knew geography well and guided them to a higher ground. According to the manuals, they had to go to Kurihama station, but they evacuated to a junior high school on a higher ground.

Even after everyone was off the train, the driver double checked that nobody was left inside the car. They went to Kunohama station which was stipulated on the manuals. The station was destroyed completely and those who were rescued from elsewhere carried to the station. The driver and the conductor were asked by emergency life guards to conduct first aids for those injured. They decided to carry out first aids for those injured with gloves on hands. There were about 50 to 60 houses on fire around the station and many injured people were taken to the station.

The passengers evacuated to a higher ground, but the driver and the conductor did not. They said, “As long as we wore uniform of JR East, we could not run away. That was our decision” What they did was right as a human being. However, this was not a right behaviour stipulated on the manuals.

## **CONCLUSION**

This paper examined the cases that the manuals of the company were not useful at all. The important thing is that the company should fulfill the social role such as; to have a secured means of communication, to eradicate dangerous spots and to set up counter-disaster measurements. However, it is more important to train a worker who is able to decide and act on their own judgements not dependent on manuals, because an incredible disaster can happen in the future.

At a large company like JR East, the order by the control centre is absolute, but they cannot see what is going on at the trouble spots. Thus, frameworks should be established to give preference on decisions by field workers rather than orders by the control centre. In such a case, it is absolutely important not to put a responsibility on an individual, even if that decision is wrong in the end. Moreover, education and practical drillings are essential. A practical education should be conducted on the field using real facilities to facilitate one's own sense of judgements.

By doing so, an awareness of reducing disaster damages will be sharpened. There are many voices on the questionnaires such as "I was able to act calmly by overcoming worries and fears", " I acted with strong sense of motivation and responsibility for my work with limited information", " I made decisions immediately by understanding my situation accurately and acted for ensuring safety. These voices truly showed those who fulfilled their own responsibilities. We regard this earthquake as a lesson, we aim to nurture a railway person who has a top priority for respecting human beings as well as philosophy of humanism.

**APPENDIX 1:**

**APPROVAL TO PUBLISH PAPER**



I, Akinori Yanagi, of East Japan Railway Workers Union, hereby give permission to the International Railway Safety Conference 2012 (IRSC 2012) to publish the paper titled: Disaster Preventions in the Time of Emergency and Social Role and Responsibility of the Railway Workers.  
To be presented at the IRSC 2012 conference to be held at the St Pancras Renaissance Hotel, London, England on 8 - 12 October 2012.

In the following media (tick as appropriate):

OK Copied to memory stick for distribution to conference delegates

OK Publish on the IRSC 2012 website

Signed: .....

Date: .....

Please return this form when submitting the final version of the paper.