CHANGING NATIONAL RAIL SAFETY PLANNING IN KOREA

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SUMMARY

About 70% of accident have been reduced in recent 10 years in Korea. As a result of H/W base safety investment in railway, such as infrastructure, signalling and rolling stock upgrade. Recent accident investigation reports describe that more than 70% of significant train accidents are caused by human factors and numbers of significant train accidents are tied up from 2012. Some accidents are caused by new hazards, which were not considered in the previous safety plan.

In order to maintain high level of railway safety and hazards management in national level, a new strategic rail safety plan is prepared. New safety plan take into account various environment change not only H/W change, but also safety cultural change. New safety plan include 34 safety measures in 5 categories; 1) management and regulation change, 2) human factor management on rail safety related work, 3) infrastructure safety improvement, 4) rolling stock safety improvement, 5) rail safety R&D.

In this study, details of new safety measures are described, which are planning to reflect national strategic rail safety plan. This plan include S/W measures such as; SMS approval, human factor management, and technical support for small size operation companies, and also include H/W measures such as; full implementation of ATP system, and standardization of safety device in rolling stocks. Plan will be applied from 2016, when new Rail Safety Act 2014 is implemented.

INTRODUCTION

As a result of H/W base investment in railway safety, such as infrastructure, signalling and rolling stock upgrade about 70% of accident have been reduced in recent 10 years. More than 94% of safety budget is invested on H/W measures. But recent accident investigation reports show that more than 70% of significant train accident are caused by human factors and number of significant train accident is tied up from 2012.

From 2013 to 2014, three significant train accidents were caused by new hazard. Though three accidents caused one fatality, each accident come close to be a catastrophic accident.

- In 2014, one train driver violate signal and result a train collision. He forgot he had turned-off all train protection system after ATS alarmed. He was addicting smart phone and SNS (Social Network Service).
- In 2014, metro train collision occurs due to signalling failure. Signalling system failure was caused by maintenance work of signalling system server. Signalling system was plan to change from ATS to ATO system. But the installation schedule was delayed due to budget.

- In 2013, two significant train accidents have been occurred at the same station with the interval of 4 minute. Train drivers were fail to activate emergency train protection systems after train collision and caused second collision. Signalling system was planning to change from ATS to ATP system.

Non-precedent train accident caused and the main cause were train drivers and maintenance personals' human factors. These accidents has never been occurred in Korea and root causes were safety culture and fast environmental/technical changes which staffs can not copy with in time. Too many railway system changes in short period, causes many stress to staffs and some staffs can not adopt new system within current training and competency system.

Not only train accident prevention measure, but also accident response measure are important. But almost every current safety measures are focus on accident prevention. Accident response measure such as efficient emergency response training system, recovery equipment's, contingency plans were not actually applied at the time of accident. In order to prevent these problem, government organized a task force team composed of expert from train operators, infrastructure manager, researchers, regulator, staff training centres and professors. TFT drove 34 safety measures in June and detailed investment plan will be made by February 2016. Major safety measures are described in this paper. These safety measure will be reflected to national rail safety plan which include current safety measures. Figures 1 and 2 show recent accident trend in Korea. (* Definitions of train accidents are slightly different that of European Railway Agency)

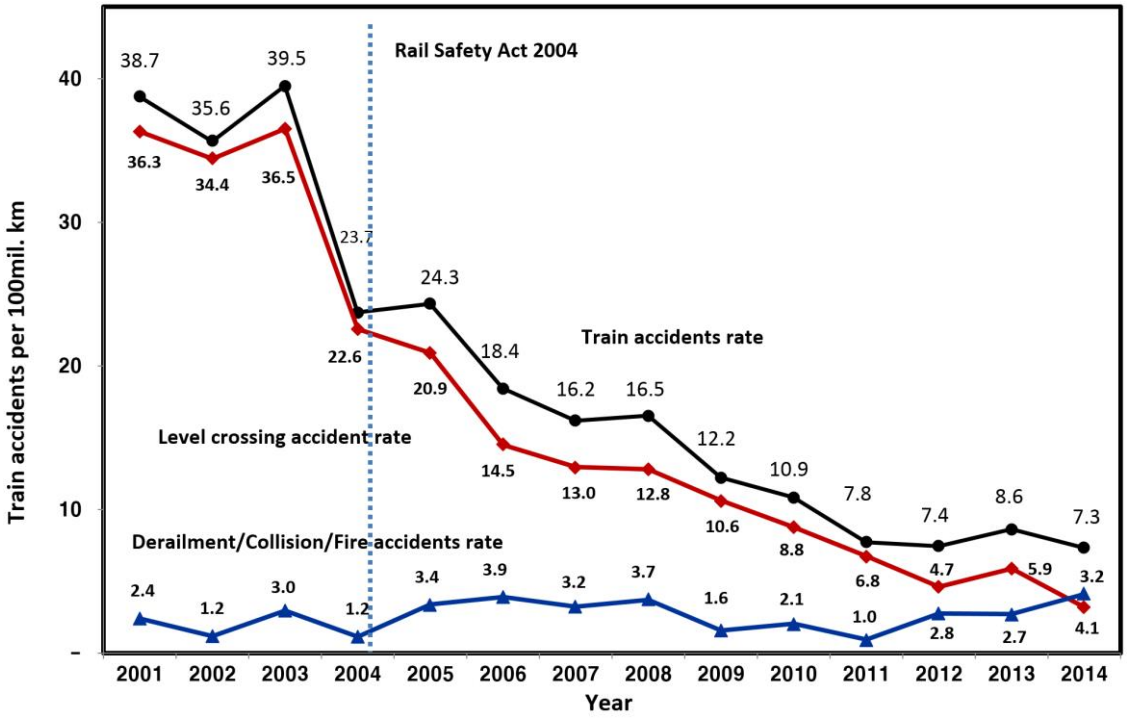

Figure 1: Number of train accident per 100 milliion train km

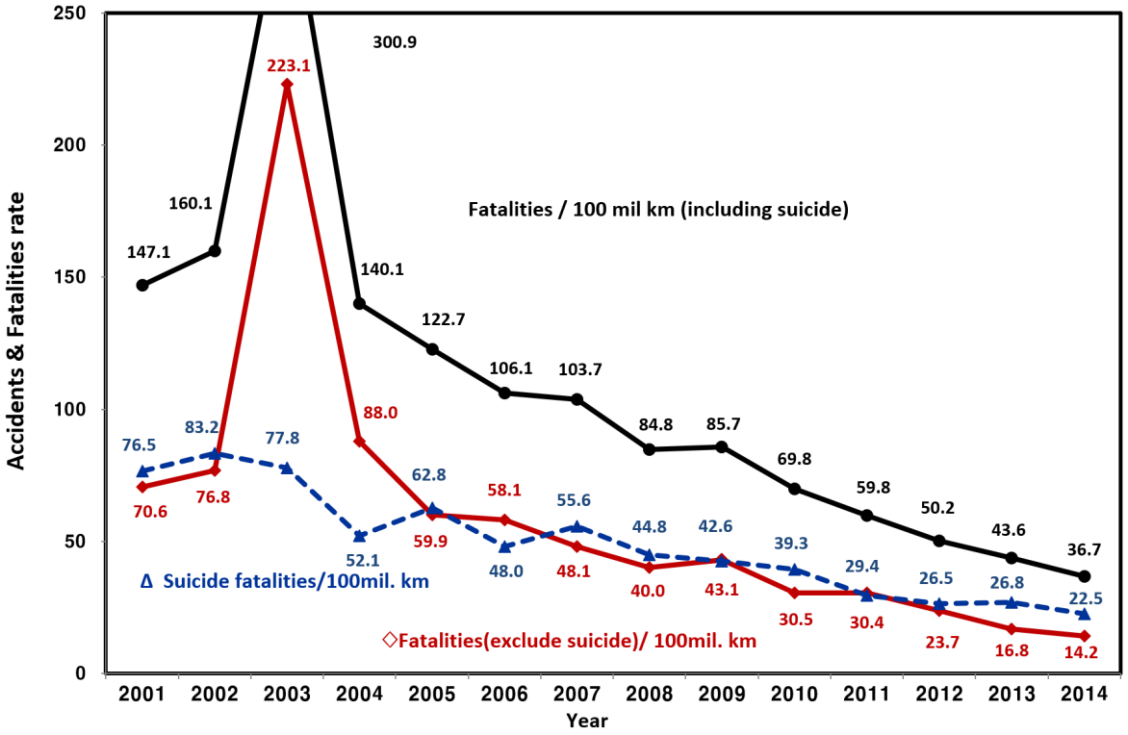

Figure 2: Number of accident fatalities per 100 million train km

In figure 1, significant accidents include train derailment, collision, fire and dangerous good related accidents. Level crossing accidents are steadily reducing after Rail Safety Act 2004 implemented. In figure 2 total accident fatalities include attempt suicide fatalities. Total train km in Korea is 218million km (in 2014).

In order to maintain high level of railway safety and hazard management in national level, a new strategic rail safety measures are derived through task force team. Safety measures will be reflect to national rail safety.

NEW SAFETY MEASURES

In order to maintain high level of railway safety and hazard management in national level, a new strategic rail safety measures are derived through task force team. Safety measures will be reflect to national rail safety plan. New safety measures take into account various environmental change not only H/W change but also safety cultural change. New safety plan include 34 safety measure in 5 categories; 1) management and regulation change, 2) human factor management on rail safety related job, 3) infrastructure safety improvement, 4) rolling stock safety improvement, 5) R&D on rail safety.

1) Management and regulation change

- Continuous increase and support for safety budget
- Revision of Railway Safety Act(2014) and establishment of Rail Security Act
- Innovation of rail safety governance and international cooperation
- Clear definition of accident responsibility on each safety personal including CEO
- Strengthening of responsibility on significant railway accident : including cancelation of train operation right, rise track assess charge
- Introduction of new TOC and competition among multiple railway operators
- Railway safety DB utilization and collection in detail
- Increase transparency for safety budget and safety investment decision

- Enforcement of competency for rolling stock maintenance companies
- Independent operation of railway control centre(currently operated by operator)
- Introduction of security check system and rule for passenger

2) Human factors management on rail safety related job

- Strengthening of safety organization for operators
- Reflect human factor management on SMS approval(currently suspended)
- Check a general practice on safety related task and change
- Settlement of safety first culture, instead of efficiency at work
- Expand competency and training at work
- Development and support rail safety training program at Univ.

3) Infrastructure safety improvement

- Expand safety investment budget and support budget for infrastructure improvement for old line
- Increase transparency for infrastructure maintenance budget and cost evaluation
- Life-Cycle cost management for infrastructure
- Expand infrastructure maintenance equipment's for reduce maintenance time
- Install ATP system for all track(exclude metro and single track)
- Install platform screen door for all subway station(currently 70% of station install platform screen door)
- Development of accident response equipment system for tunnel and bridge
- Introduction of on-line monitoring and early alert system for infrastructure and fire.
- Reduce safety and security dead zone
- Passenger and customer friendly infrastructure

4) Rolling stock safety improvement

- Support changing cost for worn-out rolling stock
- Changing/Upgrading to meet fire safety standards
- Life-Cycle management for all rolling stock
- Expansion of RCM(Risk Cantered Maintenance) application for major components
- Standardization of safety device in rolling stock(for passenger using device)

5) R&D on rail safety

- Expand cost for safety R&D including human factors management and safety issue item
- Advertisement of using safety device and safe behaviour of public

Not only above safety measures bus also current safety measures such as level crossing measure, etc. will be applied for the safe operation. Above safety measure will be reflected to 3rd National Rail Safety Plan (2016-2020) and implemented from 2016.

CONCLUSION AND FUTURE PLAN

From 2014, Safety became the main issue in Korea. As a result, Ministry of Public Safety and Security is established and safety related budget and regulation are increasing.

Through government leading safety TFT, new 34 safety measures were derived. And safety budget are discussing with Ministry of Strategy and Finance.

New safety measures are described in this paper. Not only these new safety measures bus also current safety measures such as SMS approval, level crossing measure, etc. will be applied for the safe operation. Above safety measure will be reflected to 3rd National Rail Safety Plan (2016-2020) and implemented from 2016. Through these safety plan, Korean rail safety will sustain high level of safety.