

Safety Regulation on Brownfield Project in Hong Kong

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Railway Safety Regulation in Hong Kong

Under the Mass Transit Railway Ordinance (Chapter 556), the Railway Inspector, Electrical and Mechanical Services Department of the Government of the Hong Kong Special Administrative Region is delegated with the authority to regulate the safety of the metro and railway network operated by the railway operator in Hong Kong



Greenfield Vs Brownfield Project

For Greenfield project, the project works are conducted not within in the site of existing operating lines. No interfacing and constraints due to the operation or maintenance works of the existing systems.

For Brownfield, the system implementation and testing works are conducted within the site of existing operating lines or involving the modification of the existing railway systems.



Why has Constraints for Brownfield Project?

Fundamental Goals for Existing Operating Line

- Zero tolerance for safety issue
- Zero interruption for Daily Services
- Zero shortening service time
- Zero reduction of daily maintenance work
- Zero damage of existing systems



Can avoid Brownfield Project?

Brownfield project will finally occur someday due to the following practical factors:

- Aging of existing system
- Demand on expansion of the existing networks
- Enhancement of the connectivity of different separated railway lines
- Adoption of new technology for increase of the capacity
- Maximization of the efficiency of the existing systems



Brownfield Project in Hong Kong

Shatin to Central Link (SCL)

- 17 kilometres long railway project with two sections
- 11 kilometres from Tai Wai to Hung Hom section
- Link up the Ma On Shan Line(MOL) and the West Rail Line(WRL) forming the East West Corridor
- 6 kilometres from Hung Hom to Admiralty section
- Join the East Rail Line(EAL) at Hung Hom forming the North South Corridor.





The major brownfield works of SCL project

Upgrading of the existing signalling systems for EAL

- The EAL signalling system upgrade to CBTC
- Central and track-side equipment to be installed in the existing operating line
- The new signalling system will also needed to extend to the new NSL rail section.



The major brownfield works of SCL project

Upgrading of the existing signalling systems for MOL & EAL

- Modified to cater for the mixed fleet operation for the trains with different no. of train cars
- (4/8 car mixed fleet for MOL and 7/8 car mixed fleet for WRL)
- Future integration with the MOL, WRL and the new EWL rail section.



The major brownfield works of SCL project

Incorporation of additional new signalling equipment to existing trains (Dual-fitted trains) for EAL

- The existing 29 trains in EAL will be equipped with the new trainborne signalling
- During the non-traffic hours, the dual-fitted train will be switched to the new signalling trainborne equipment for testing.



The major brownfield works of SCL project

Conversion of the existing trains

- 8-car train for future SCL
- Currently, 4-car train in MOL
- Currently, 7-car train in WRL
- Existing trains will be reconfigured and converted into 8-car trains with duly incorporation of new train cars.



The major brownfield works of SCL project

Platform Extension and Change of the stopping position of trains for MOL

- Originally designed for 4-car train operation in MOL
- Extension of Platform for meeting the 8-car train
- Existing evacuation paths required to be redesigned



The major brownfield works of SCL project

Mixed fleet operation of trains with different no. of train cars running in the same railway line for WRL and MOL

- 4/8 car train operation in MOL
- 7/8 car train operation for WRL
- As a transition period.



The major brownfield works of SCL project

Integration of the existing signalling systems of the separated railway lines with the new sections

- The ultimate target of SCL is to form a grant railway networks by integration of the existing railway lines and the new sections
- The integration of the relevant system such as signalling systems is required.



Constraints, impacts and safety concerns

Very Limited time for Project Works

- In Hong Kong, it is not affordable to close the existing operating lines to conduct the upgrading or modification works
- Normal operating service is expected unaffected by the public anytime.



Constraints, impacts and safety concerns

Breaking down the implementation works and testing into different Zones and Stages

- For minimization the disruption to the operation and maintenance of the existing lines
- Installation and testing completed zone by zone(e.g. signalling system)
- The entire system implementation and testing will be more time consuming and complicated.



Constraints, impacts and safety concerns

Safety Concerns on Mortifications/Interfacing new equipment module to the Existing system

- There may be damaging on the existing system during mortification and upgrading works



Constraints, impacts and safety concerns

Safety Concerns on frequent switching between the new and existing systems

- For system testing, switching to the new system is required during the non-traffic hours
- After the testing, it is required to switch back to the existing system for resuming the normal operation
- Detailed inspection and checking the status, setting and condition of the existing system for ensuring all its orders are required



Constraints, impacts and safety concerns

Safety Concerns on Complicated site Management and Communication

- The existing railway line should be handed over to the operating from the project team after the project works
- Mis-communication or unclear demarcation of role introduce addition safety impact



Constraints, impacts and safety concerns

Safety Concerns on Unauthorized System Change-over

- Mis-switching during traffic hours will result very serious safety impact



Constraints, impacts and safety concerns

Safety Concerns on Changing of Site Situation and Operation Mode

- For brownfield project, there will be various interim operations mode, such as, mixed fleet operation in SCL project
- Such changes will affect the existing operations very much.
- Once there are not suitable changes of the operation procedures and sufficient training, additional safety impact will be resulted



How to Ensure the Safety from the Railway Safety Regulator Perspective?

Request the Railway Operator to Identifying Activities or Items with Safety Impacts, such as:

- Modification or upgrading
- Switching between the new and old systems
- Change of the current site conditions
- Change of the current operation modes
- Unclear role and responsibility among project team, maintenance team and operation team
- Unclear communication mechanism among project team, maintenance team and operation team



How to Ensure the Safety from the Railway Safety Regulator Perspective?

Request the Railway Operator to Conduct the detailed Risk Assessment

- Risk assessment for each identified activities
- Risks may be from the system design, system implementation, system testing, any interim or transaction period, ambiguity of responsibility or communications, etc.
- Work out and implement mitigation measures



How to Ensure the Safety from the Railway Safety Regulator Perspective?

Request the Railway Operator to work out Comprehensive Overall Planning

- The railway operator is requested to work out a comprehensive planning for the entire project cycle from system design, implementation, testing, migration and service launching taking into account the brownfield situation



How to Ensure the Safety from the Railway Safety Regulator Perspective?

Request the Railway Operator to Establish Clear Role and Responsibility among Project, Maintenance and Operating teams

- The role and responsibility among project, maintenance and operating teams for checking and confirming the system condition, setting and configuration should be very clear without any ambiguity



How to Ensure the Safety from the Railway Safety Regulator Perspective?

Request the Railway Operator to Establish Close and Effective Communication among Project, Maintenance and Operating team

- In the brownfield, the system project works and the maintenance works of existing system are always in the same site
- Any confusion or mis-interruption of their messages, such as movement of engineer train, will have very serious safety impacts.



How to Ensure the Safety from the Railway Safety Regulator Perspective?

Request the Railway Operator to Ensure Sufficient Competent Manpower Resources

- It also involves working in multiple, comprehensive system and management of interim operation.
- All such safety assurance activities require sufficient well training staff.



How to Ensure the Safety from the Railway Safety Regulator Perspective?

Request the Railway Operator to Complete Safety Checking

- Due to the very limited time for project works for brownfield project, many works are required to be conducted in meal pieces
- For ensuring the safety for the existing railway line, system checking before and after the works must be performed



How to Ensure the Safety from the Railway Safety Regulator Perspective?

Request the Railway Operator to Update Operation and Maintenance Procedures and Guidelines

- In the course of system implementation, testing and migrations, the current operations will be affected
- The suitable updating of operation, maintenance procedures and specific guidelines is important



How to Ensure the Safety from the Railway Safety Regulator Perspective?

Request the Railway Operator to Continually Review the Changes of the Site Situation and Operations

- The site environment, equipment set up and operation mode may be changing from time to time in different project stages
- Keep track the latest situation and any safety impacts for conducting the necessary actions accordingly



How to Ensure the Safety from the Railway Safety Regulator Perspective?

Request the Railway Operator to Provide Independent Safety Assessment

- For major systems, such signalling system and rolling stock, independent assessment in railway safety before final service launch for both existing and new railway sections in ensuring the safety.



How to Ensure the Safety from the Railway Safety Regulator Perspective?

Request the Railway Operator to Work out Safety Assurance Plan

- Comprehensive safety assurance plan for major system works, such as, signalling system and rolling stock
- Define different stages
- Define the workflow of various project activities
- Identify the hold point and requirements of safety support, such as, operator's safety certificate, ISA's endorsement or reliability run requirements
- The safety assurance plan should focus on the safety impact of the actual arrangement of system project works in different stages



How to Ensure the Safety from the Railway Safety Regulator Perspective?

For the incident occurred

- The Railway Safety Regulator will audit on the railway operator's asset management system or safety management system in risk base approach to ascertain any necessary enhancement



Conclusion

Ensure the Railway Operator Conducted necessary actions without sacrificing the Railway Safety no matter how many constraints in Brownfield



