

# **No Secrets in Safety**

## **Best practice approach at Airport Authority Hong Kong**

The Third Runway Division of the Airport Authority, responsible for the delivery of the new Third Runway System and associated works, is actively pursuing improvement in several areas of safety management. The aim being to help raise the standard of construction safety on the project and generally within the construction industry in Hong Kong.

At the joint seminar between the HK TWf and the ICE HKA on 1<sup>st</sup> Jun 2019 – Temporary Works Roadmap and the Clients' Expectations, the following initiatives being taken by the Third Runway Division of the Airport Authority were discussed.

1. TRD V Commit Programme
2. Enhanced specification requirements for the management of temporary works on site.
3. Approach to Safety by Design.

### **TRD V Commit Programme**

This is a six year programme that has been put in place and will develop with the 3RS project and as the works progress. The aim being to improve worker welfare, ensure best safety practice is employed on all contracts and encourage all the works in the project to take forward the improvements to future projects for the benefit of the HK construction industry.

Initiatives include:

- Improved welfare facilities
- Best practice training facility
- Targeted safety improvement campaigns
- Annual safety seminar
- Supply chain involvement (equipment and material)

### **Enhanced Temporary Work Management Specification**

The HK TWf has produced a comprehensive Practice Note on the management of temporary works. Contractors in HK implement the basics identified within this document to a greater or lesser extent.

To ensure that all contractors tendering for works on the 3RS project allow for the level of temporary works management expected on the project, the safety specification has been enhanced to include the basic requirements identified within the TWf Practice Note.

The extract for the specification requirement is as noted here:

The content and management regime of the Temporary Works Management Plan (TWMP) shall cover as a minimum the following:

- Key stakeholders and their competence
- Classification of temporary works complexity
- A temporary works ITP (Inspection and Test Plan)
- A systematic temporary works checking process and associated documentation
- A temporary works Non-conformance and AAHK notification process
- A regular temporary works review meeting
- A temporary works compliance verification system
- A systematic follow up procedure to correct any findings identified at any stage of the temporary works process
- In-house TW Assurance system

All contracts will have their own contractual processes by which they manage their works but by following the requirements noted above they will get close to or exceed the best practice in the management of temporary works.

To help contractors who may not have mature procedures in the area the Airport Authority, at the start of the contract, are providing templates and guidance on the development of the TWMP and encouraging direct use of the TWf Practice Note.

### **Safety by Design**

The Airport Authority recognised after the construction of the Chek Lap Kok Terminal 1 that improvement could be made at the design stage of the project to ensure facilities were safer to build, operate and maintain. Each new project has taken on board the lessons learnt and today there is a structured process in place to ensure “Safety by Design” is included in the initial phases of any project.

This is driven by maintenance safety. There is a requirement within the Design Consultants Scope of Services to produce a maintenance report that is reviewed and vetted by the Authorities Project and Maintenance Teams. Input is provided from experienced personnel in the design, construction and maintenance teams to ensure that at all stages of the project the designer’s proposals are safe to construct and maintain.

This has been particularly noticeable in the development of the various roofs within the large facilities that have been developed since the original Terminal 1. The recent submission of the new Terminal 2 roof to the Lighthouse Club Design for Safety Awards is a case in point. The approach to roof design and construction is now very much geared to modularisation, ease of construction and simple safe access for maintenance. The following steps are being adopted to ensure this.

- Modularisation is studied to enable as much of the fabrication as possible can be completed off site in factory conditions and on site working at height is minimized.

- Erection methods are studied before tender and detailed design requirements concluded (with additional information provided for tenderers) to ensure that a safe erection method is available for contractors to adjust to suit their preferred method of work.
- Detailed maintenance requirements are built into the design to ensure that the future operation and maintenance of the facility can be undertaken in an efficient and safe manner.

It is a well-known fact that the earlier in a project initiatives are taken to enhance safety the greater the benefit. By enhancing the above measures the authority is ensuring that at all stages of the project safety is being considered and it is not all being pushed onto the contractor, who in some cases is not the person best placed to realise the biggest gains in safety.

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## **Safety is our Priority at MTR**

When a society undergoes development, there is an increase in demand of having more infrastructures such as express railway link. However, construction activities of the infrastructure development would usually be associated with safety problems. Accidents easily happen when safety precautions are not properly taken and this brings along fatality, loss of money and delay to the progress. Therefore, when implementing a construction project, proper consideration by designers should be given to improve and ensure a safe and health working environment during various stages of the project. The Safety by Design shall be considered at the early stage of the project. The following categories are to be considered by designers with input from the construction experts:

1. Hazard Identification
2. Ground Conditions
3. Temporary Works
4. Access for Construction / Operations
5. Benefits of Safety by Design Application
6. Communicating residual risk to operation teams

### **Hazard Identification**

To ensure the safety of the operation and maintenance staff, proper safety considerations should be taken in the design of the general arrangement for the proposed works. Hazard identification should be initiated at the early design stages to eliminate or minimize the risk of injuries. For examples, designers shall identify the main risk for temporary work is working at height. Fall from height is one of the major accidents in Hong Kong which cause serious body injuries or fatality. Designers should not only focus on cost & time saving construction but also consider the safety of the public and labour. In view of workers being exposed to working at height, pre-fabrication method shall be selected as possible to minimize the risk. In addition, safety accesses for inspection and maintenance must be detailed.

### **Ground Conditions**

Constructability should be considered, and safety factors are to be included in the construction for:

- Ground conditions – Deep excavation in ground where shear strength is low, is to be avoided if possible
- Proximity of construction to other vulnerable and sensitive features. Assessment of feature and buildings are to be performed
- It has long been recognised that more ground investigation should be performed at the early stage of design, and it is a worthwhile investment
- Construction methodology and sequence

## **Temporary Works**

All temporary works shall have designs prepared and checked by competent person. Temporary work coordinators shall be appointed on each project to coordinate all temporary works design, review, approval and distribution of certified design details. The following points should be considered during design stage.

- Temporary works are suggested to be designed to permanent works design standards.
- A good approach is to use the permanent works to support construction loads. Consideration should be given during the design stage to the benefits of staged construction
- Redundancy struts are to be allowed in ELS for unforeseen conditions.
- Risk of accidental loads is higher than risk for permanent works.
- Repeated erection and dismantling introduce hazards related to integrity of temporary works.

## **Access for Construction / Operations**

- Suitable and safe accesses and platforms for construction shall be included in design drawings and method statements.
- Designs which minimise access requirements during construction and operation are encouraged
- Designers should satisfy themselves that access platforms which are necessary can be provided in a practical manner
- It has long been recognised that good quality access is a worthwhile investment. Any 'savings' made by reducing the quality of the access will be wiped out in the event of injuries
- Fall from height in tunnels, service duct riser, deep sump, etc.. should be considered and designed out
- Adequate consideration should be given to close all gaps and openings to prevent falling objects at each stage of construction and use.

## **Benefits of Safety by Design Application**

- Improved awareness of the need for consideration of construction safety & ease of construction during design, within employer and the designers
- Facilitated workshops for employer and the designers to make efforts to design out construction safety risk
- Further education & cultural reinforcement needed throughout industry (Employer, Project Managers, Designers, Contractors)

## **Communicating Residual Risk to Operation Teams**

Designers shall communicate the significant residual risks with operation teams who may not understand the design making them missing some of the critical risk. Face to face briefing is a good form of communication such as toolbox talk or site briefing. Moreover, BIM model is also a good tool to provide 3D view for operation teams easily understanding and identifying the risk.

To conclude, safety is everyone's responsibility. Traditionally, most of the projects were evaluated only with the technical and financial viability, with the growing consciousness for the construction safety issues in recent years; it becomes apparent that a thorough consideration in safety aspects is essential for construction site safety.