Structural Designer's Risk Assessment

CROFT STRUCTURAL ENGINEERS

Project Name : 6 Sumatra Road
Job Number : 150105
By : EJ **Chkd :** ct
Date: 13/04/16
Last printed 4/13/2016 4:36:00 PM

Ref & Rev	Hazard Identification	Initial Risk	Design Action	Action By	Residual Risk	Comment

Advice on Document

This document is the designers risk assessment. The intention is to look at the risks involved in the project and highlight to the contractor where those risk might lay. It is considered that the contractor and all site staff will follow all HSE guidelines and regulations.

As the project progresses there may be other risks not identified within this document that should be notified to all and the Principle Designer, Principle Contractor & Client. On a basement project a Temporary works co-ordinator should be appointed/named to oversee the temporary works of the project.

Any residual risks of 2 to 3 should be further considered by the contractor and additional working methods employed to reduce the risk. The last column provides suggestions for ways to reduce the residual risk.

Revision	Date	Notes

	Severity:	Probability:
High	Capable of causing death, serious injury or destruction of property	Likely to occur very frequently or continuously
Medium	Capable of causing major injury, severe illness or property damage	Probably will occur
Low	Capable of causing minor injury or damage	Unlikely to occur

Probability \ Severity	High	Med	Low
High	3	3	2
Medium	3	2	1
Low	2	1	1

Risk Matrix Risk = Severity x Probability

Risk = 1 Low risk – No action required

Risk = 2 Medium risk – action required unless good reason

Risk = 3 High risk – action required

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Highlighted Risk The designer considers are worthy of additional note Risks that are non-typical and special to this kind project to be listed here

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1.1.	Borehole did not indicate water	3	Borehole required and monitoring of water table throughout the project	Contractor	2	
1.2.	Stability and Demolition of Structural	3	All elements to be propped locally. Demolition contractor to provide demolition method statement to CA prior to works beginning. Design to allow for structure to be demolished without major loss of stability.	Contractor and Croft	2	
1.3.	Services. Electrocution. Gas pipelines. Sewage and process effluents	3	Demolition contractor to conduct site survey of all services prior to works beginning.	Contractor	2	
1.4.	Falls from height. Placing, stability and provision of working platforms, access.	3	Designed to be prefabricated off site where fabrication takes place on the ground and overhead cranes are used, Specify additional holes in steelwork for fixing safety harness. Permit to work to ensure operatives are trained and qualified to carry out task.	Croft	2	

1.	Demolition					
1.1.	Falls. People, objects, supports, plant/machinery, material. Unauthorised access.	3	Provide adequate scaffolding and access Prevent unauthorised access. Provide barriers to side of excavation Where possible use long reach machines	Contractor	1	

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1.2.	Plant and machinery. Crushed/trapped/hit by plant falling/running into excavation. Fumes.	3	Provide traffic management controls Bring conveyor belt in sections Keep generator outside to reduce plant fumes	Contractor	1	Installation of conveyor belt
1.3.	Working environment. Noise, vibration, exhaust fumes, trips, open demolition, and vibration form hammers, noise.	3	Provide personal protective equipment to operatives. Programme sequence of works so that different trades do not work in similar area	Contractor	1	Main concern is fumes so necessary to provide good ventilation
1.4.	Services. Electrocution. Gas pipelines. Sewage and process effluents	3	Demolition contractor to conduct site survey of all services prior to works beginning.	Contractor	2	
1.5.	Stability and Demolition of Structural	3	All elements to be propped locally. Demolition contractor to provide demolition method statement to CA prior to works beginning. Design to allow for structure to be demolished without major loss of stability.	Croft and Contractor		Contractor to provide temporary works
2.	General concrete					
2.1.	Falling from height. Operatives falling during: preparation of falsework, formwork, concreting, curing.	3	Where possible designed using pre-cast units and sections. Not possible Handrails around excavations	Contractor	1	Handrails around any excavations Cover excavations when not in use
2.2.	Health hazards. Cement dust. Wet concrete causes skin/eye irritation and caustic burning.	2	Design elements using pre-cast units and sections. Pre-cast units (not possible) and section are manufactured in factory with controlled environment. For In-situ work, specify ready mix concrete. Correct PPE	Contractor	1	Hand mixing on site is a high risk

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2.3.	Noise. Concrete: compaction, scabbling and breaking.	2	Minimise in-situ concrete works (not possible). Provide personal protective equipment.	Contractor	1	PPE essential
2.4.	Inhalation of dust. Concrete: demolition, drilling/cutting and scabbling.	2	Provide openings and builders-work details in reinforced concrete design to prevent drilling and cutting. To achieve this M&E design to progress & be co-ordinated together with reinforced concrete design. Provide personal protective equipment.	Croft Contractor	1	Specify predrilled holes Provide PPE
2.5.	Impact. Concrete vibrators. Concrete pumps. Moving plant contact. Skips, dumpers.	3	Where possible elements to be designed using pre-cast units and sections to reduce in-situ concrete works. .	Contractor	2	Provide Banksman Provide Schedule of Works Tight site plant will be a concern
2.6.	Fumes/heat. Cutting/thermic lances: inhalation and burns.	2	Provide openings and builders-work details in reinforced concrete design to prevent drilling and cutting. To achieve this M&E design to progress together with reinforced concrete design. Provide personal protective equipment.		1	
2.7.	Injuries. Protruding reinforcement bars from sections	3	Provide protector caps, detail U-bars where practicable	Croft Contractor	1	Better detailing of reinforcement - use U bar To provide caps on protruding bars
3.	In-situ concrete					
3.1.	Falls from height. Accessing or working on scaffold, preparing for or placing in-situ concrete, access, working on formwork.	3	Contractor to provide correct access and scaffolds Where possible elements to be designed using pre-cast units and sections to reduce in-situ concrete works. (Not possible).	Contractor	1	

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3.2.	Noise, Vibration. Working with vibrators, scabblers, saw etc	3	Site survey to inspect footings Use suiltable PPE	Client	1	Trial pit require
3.3.	Collapse. Formwork/false-work, permanent structures collapse under loading from fresh concrete, excessive spans, and large sections.	3	Contractor to design false & form work. Details to be forwarded to CA prior to works beginning.	Contractor	1	
3.4.	Moving plant. Collision with moving machines (concrete trucks, concrete mixers, pumps,dumpers etc.).	3	Contractor Provide traffic management controls. Provide Banksman	Contractor	1	
3.5.	Health hazards. Inhalation of dust from cement, modifier or scabbling concrete for surface preparation and blowing out pours.	3	Provide personal protective equipment.	Contractor	1	
3.6.	Irritants. Concrete constituent materials, mould oils: skin/eye irritation and caustic burns.	2	Wear Correct PPE	Contractor	1	
3.7.						
4.	General Steelwork					

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4.1.	Falls from height. Placing, stability and provision of working platforms, access.	3	Designed to be prefabricated off site where fabrication takes place on the ground and overhead cranes are used, Specify additional holes in steelwork for fixing safety harness. Permit to work to ensure operatives are trained and qualified to carry out task.	Croft Contractor	1 2	Name stability frames on drawings
4.2.	Collapse. Storage areas, stacking and stability, falling objects, access, temporary bracing.	3	Contractor to allow for correct storage and provide a storage area. Fabricator & contractor to provide method statements to CA prior to erection. If practicable begin erection at stability elements. All stanchions to have 4 bolt connections	Contractor	1	
4.3.	Hazardous operations. Cutting/Welding. Painting. Descaling.	3	Designed to be prefabricated off site where fittings are welded on the ground and specify additional holes in steelwork for fixing safety netting. All site welding to be conducted under a hot works permit Touch up topcoats to be site applied. Finishing coat to architects specification and CDM.	Croft Contractor	1	Specify welding connection
4.4.	Mobile plant. Delivery, traffic control, offloading, slinging. Site route.	3	Qualified banksman & crane operator to be used at all times	Contractor	1	
4.5.	Moving objects. Remedial works, plumbing, levelling. Trapping. Manual handling.	3	No manual handling of items over 20kg Bases to be grouted as soon as structure is plumb	Contractor Croft	2	Consider splicing Design smaller sections or 2nd steel instead of 1 big steel section
4.6.	Noise vibration. Bolting, drilling. Reaming.	2	Correct PPE and guards to be used at all times.	Contracto	1	

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4.7.	Falling object. Lifting long span trusses.	3	Design & detail steelwork so that member is of manageable length and weight for transportation & erection. Bolted connections will be specified where possible, with some site welding required for architectural reasons. If site constraints predict lengths may need to be spliced in smaller lengths than 18m.	Contractor	1	
4.8.	Falls from height. Placing, stability and provision of working platforms, access.	3	Designed to be prefabricated off site where fabrication takes place on the ground, and specify additional holes in steelwork for fixing safety harness. Designed to be prefabricated off site where overhead cranes are used. Permit to work to ensure operatives are trained and qualified to carry out task.	Contractor	1	Provide handrails
4.9.	Collapse. Excessive loading or load reversal. Inadequate ties, struts or bracing. Incorrect sequence. Incomplete assembly.	2	Beams & columns are restrained laterally by other members and are not capable for spanning full distance under Dead load conditions. Ensure all braces and struts are allowed for. Fabricator & contractor to provide method statements to CA prior to erection. If practicable begin erection at stability elements. Do not overload elements during construction	Croft	1	Fabrication Specify Temporary support?
4.10.	Noise vibration. Pneumatic and manual wrenches and hammers	2	Provide PPE	Contractor	1	
4.11.	Harmful substances. Sparks and heat from burning and welding. Electricity. Paints, greases etc.	2	Designed to be prefabricated off site in controlled environment to reduce fire, flammable, vapour and gas hazards from welding and painting of steelwork. Specify brush apply site intumescent paint to reduce pollution.	Croft Contractor	1	Off site galvanising

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4.12.	Moving objects/trappings. Placing of steelwork. Closure of joints. Sharp objects. Baseplate packing.	2	Qualified steel erectors to be used. Bases to be grouted as soon as structure is plumb	Contractor	1	
4.13.						
5.	Masonry					
5.1.	Handling. Weight, shape, transportation of units. Working space, hoists, manual handling at height.	2	Design Blocks to be less than 20kg. Reduce overhead working where possible,	Croft	1	How heavy are the lintels you specified?
5.2.	Hazardous substances. Cement handling, lime and mortar mixing, chemical grouts, additives, dust	2	Provide personal protective equipment. Off site batching of mortar, allow retarders .	Contractor	1	Contractor to provide PPE
5.3.	Access. Delivery/offloading. Plant on site. Obstruction by other building elements. Working space restrictions.	2	Allow for traffic & personnel movement management.	Contractor	1	
5.4.	Crushing. Placement of units, insufficient space for storage/working, falling objects, vehicle movement.	2	Allow for adequate site storage in site planning. Provide traffic management controls. Make sure stacking is done properly.	Contractor	1	
5.5.	Collapse. Unpropped construction, elements being overloaded, movement joints, storage/stacking irregular units, horizontal chases, DPC debonding.	2	Specifications state maximum lifts, joint centres for contractor to follow. Masonry walls to be propped over 3 metres tall	Contractor	1	

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5.6.	Abrasion/cuts. Masonry texture, wall ties, metal lathing, sheet metal. Insulation (glass fibre).	2	Specify ties without sharp edges. PPE to be worn	Contractor Croft	1	Specify butterfly ties if needed
5.7.						
6.	Timber					
6.1.	Falls from height. Erection sequences during installation, edge protection, platforms, access.	3	Provide prefabricated trusses and beams were possible. Give good access	Contractor	1	
6.2.	Collapse. Temporary stability. Inadequate staging/support. Ground support for cranes. Stacked material	2	Contractor to provide adequate firm level area for material storage. Materials to be stacked in compliance to suppliers recommendations. Notching for services to be approved by engineer	Contractor	1	
6.3.	Health hazards. Wood preservatives, Adhesives, resins. Treated timber. Wood dust.	3	Follow COSHH requirements of products. Use factory applied timber treatment where possible to reduce site works.	Contractor	1	Contractor to use PPE Specify tantalise
6.4.	Access. Site layout, delivery routes. Storage, cranage, erection sequences.	3	Allow for storage areas	Contractor	1	
6.5.	Mobile plant. Delivery lorries, site transport, cranes, dumpers, inadequate working space, erection sequences.	3	Provide traffic management controls	Contractor	1	

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6.6.	Handling. Off-loading, stacking and erecting components (manual and use of crane), Metal connectors/cleats. Cuts and splinters.	2	Provide traffic management controls Storage areas to stack wood LV hand tools to be used. Maximum single person lifts 20kg all other elements to be craned into position.	Contractor	1	
6.7.						
7.	Retaining walls - Underpinning					
7.1.	Moving plant. Collision with moving machines (concrete trucks, concrete mixers, pumps, dumpers etc.). Delivery, traffic control, offloading, slinging. Site route	3	Provide traffic management controls	Contractor	1	
7.2.	Plant and machinery. Crushed/trapped/hit by plant falling/running into excavation. Fumes.	3	Provide traffic management controls Have banksman on duty where necessary	Contractor	1	
7.3.	Access. Delivery/offloading. Plant on site. Obstruction by other building elements. Working space restrictions.	3	Provide traffic management controls Programme sequence of works so that different trades do not work in similar area	Contractor		
7.4.	Falls Into excavations, from uncompleted walls.	3	Allow for slopes to be battered or support to be provided.	Contractor	3	
7.5.	Health & Hazards Contact with contaminated ground. Groundwater.	3	Ground investigation to determine ground conditions. If SI not available search online for previous usage of site	Croft	3	Ask for SI and inform client and contractor

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7.6.	Irritation (Health & Hazards) Cement, and plant lubricants.	2	Provide PPE	Contractor	1	
7.7.	Collapse Unstable ground conditions. (High Ground water levels) Collapse of footing above	3	Ground investigation to determine ground conditions. Site Survey Method statement provided by Croft Contractor to provide own method statement Pins less than1 m wide Request temporary works design Prop existing footing Prop full height of all excavations Initial design for trench sheeting Specification of easier reinforcements (use mesh where possible) Dowel bars specification Soil conditions/chemicals Take water level into consideration Take 1/3 soil away from middle of site when casting concrete slab	Croft Contractor Croft	3	Stability when temporary Propping is required Design wall to be stable at temp position Remove all loose material (loose masonry) from spreaders. Sacrificial props – pins to be staggered
7.8.	High ground water level	3	Provide borehole tests Design water 1m below ground level for permanent conditions	Contactor	1	
7.10	Services. Buried underground and overhead services including gas, electricity, water and drainage by drilling, driving, impact, vibration and settlement.	3	Site Survey required. Hand dig first 1000mm and CAT scan	Contactor	1	