

Ormond Building

Specification for Intrusive Structural Investigations

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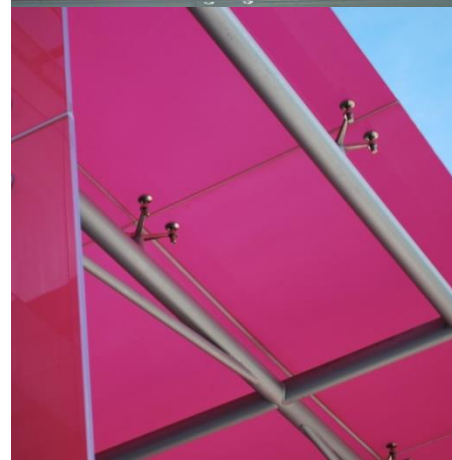
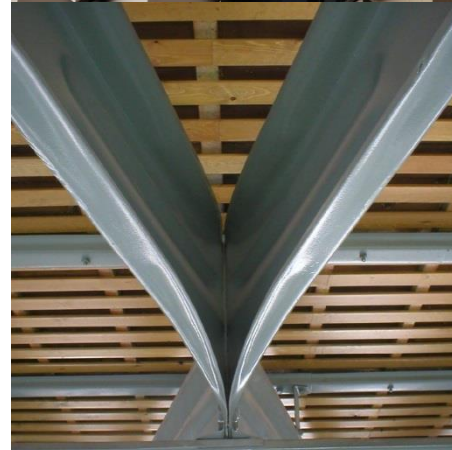
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1.0 The Works

1.1 General Description of the Investigations

A schedule of Investigations is contained within Appendix A and these capture the extent of the survey works that are to be completed. Generally, this involves the removal of concrete surrounding steel beams. These beams are showing signs of corrosion and need to be inspected to determine an appropriate repair. The concrete surrounding the beams also needs to be tested to determine the cause of the corrosion to ensure the repair is appropriate in the long term.

As there is currently props supporting the floor it is proposed not to reinstate the concrete surround to the beams immediately after the investigations as there may be further inspection/surveys required and the repair technique may require access to the steel. As such this would require further breaking out and is to be avoided. It is proposed that the concrete will be re-instated as part of the repair works. All other concrete will be re-instated.

The required survey locations should be checked to ensure they are accessible and that no services are present, or that the area is inaccessible for any reason. If access is not available the contractor is to agree another location with the engineer. This checking exercise is to be done prior the start of the investigation site period to prevent delay and any moving of investigations will not be a valid reason for extension to the site program.

No access equipment is to be provided and therefore the contractor should allow for the provision of suitable access equipment within their tender sum. All tenderers are responsible for ensuring any access equipment used is suitable for accessing all areas where surveys are required.

The tenderer should allow within their tender for making good of all intrusive elements of the investigations outlined above.

Though not exhaustive the following list describes the key aspects of the works: -

1.2 Structural Investigations – Non-Intrusive

1.2.1 Ferro Scans (F)

Ferro scanning of various structural elements is to be undertaken to determine the size and spacing of any reinforcement within the structural element.

- For slabs, the size and spacing of all the horizontal bars in both directions in the bottom of the slab should be scanned and recorded. A patch of slab large enough to record a minimum of 3 No

bars in both directions should be surveyed (this shouldn't be more than 600mm in either direction, where the survey location is shown).

1.3 Structural Investigations – Intrusive

The steel beams that are to be investigated are showing signs of corrosion and need to be investigated to determine an appropriate repair solution. The beams are currently encased in concrete and they concrete will need to be removed to allow cleaning/inspection of the beams.

1.3.1 Carbonation Testing (C)

Carbonation testing of the slab is to be undertaken to determine the presence of any carbonation as well as the depth to which the carbonation is present. The depth of carbonation at each location should be recorded.

- For slabs and beams, the soffit should be tested and recorded.

The pilot hole used to obtain the samples should be no more than 25mm in diameter and go in as far as the first layer of reinforcement (usually 25-50mm). The element should be ferro scanned in advance of the core and the core located to avoid all the reinforcement in that area. All holes are to be made good using a FOSROC (or similar approved) product.

Methodology

Carbonation depth is measured using a 1% Phenolphthalein indicator solution applied to a freshly exposed concrete surface. A change in colour from clear to pink indicates the depth at which chemical changes within the concrete due to the carbonation processes have ceased.

Surface exposure is normally achieved using a percussive drill fitted with a 25 mm Ø drill bit. The drill is advanced in 5mm increments. At each increment the exposed surface is wetted with the indicator solution and the process repeated until the colour change is observed.

The carbonation depth to the nearest 5mm is recorded. It is also important to record the minimum depth of cover at the same location if carbonation depths are found to vary across the site.

Porous or honeycombed concrete can result in greater depths of carbonation so notes on the condition of the concrete at test locations should also be made.

Where HAC or cement replacement materials are suspected, results from phenolphthalein indicators can be suspect, in these cases carbonation depths should be confirmed by petrographic analysis in the laboratory using a core sample.

1.3.2 Chloride Testing (CH)

Chloride tests are required at the locations indicated on the existing floor plans attached in Appendix A. The methodology for this test is identical to carbonation testing with the exception that the concrete dust is collected from the sample hole to be test in a lab and the depth for samples is usually up to a depth of 75mm.

1.3.3 Measurements (D)

Measurements of existing structural beams are to be taken at the locations indicated on the existing floor plans attached in Appendix A, the structural elements should be measured to determine their size. The concrete surround will need to be removed enough to allow access to remove any corrosion and to accurately undertake the required measurements.

- For beams, the flange width and thickness should be measured as well as the beam depth prior to the corrosion on the beam being removed. The beams should then have the corrosion removed either by wire brush or other abrasive hand technique. Once the corrosion has been removed the same measurements as above should be undertaken as above to determine the remaining section size. If there is any section loss locally in the web or flange the depth of the loss should be measured and it should be noted on the survey results and annotated on the photos.
- Photos are to be taken at every measurement location and any disintegration of the flange or web should be noted.

Methodology

The area of concrete should be removed using percussive drilling tools to allow the measurements to be taken and this area is anticipated to be around the following for each element being investigated:

Beams: 300mm long x 150mm high

The steelwork is then measured and recorded and photos taken as required above.

The beams should then have the corrosion removed either by wire brush or other abrasive hand technique and the measurements taken again. Photos should be taken showing the post- corrosion removal state.

1.3.4 Floor Coring (FC)

A Core is to be undertaken in the floor of the basement to assess the concrete slab thickness/make-up.

The following items should be recorded:

- Concrete thickness
- Dimension of any finishes

- Sub-strata description
- Presence of any waterproofing barriers
- Reinforcement size (if encountered)
- Photos of cores along with measurement

Methodology

The core rig is to be securely fixed to substrate using an HKD expanding anchor set firmly into concrete surface.

Where drilling is to be carried out horizontally or vertically up, a hydraulic core rig shall be used, or electric motors shall be fitted with suitable water collection equipment to prevent damage to the electric motor.

A core barrel of the correct size shall be fitted to the drill motor (100mm Ø recommended for compressive testing). A Water flush pump shall be connected to the drill and a steady flow of water should be allowed to run through the core barrel.

With the core bit positioned just above the surface to be cored the drill motor shall be switched on, drill speed should be selected to match the size of the core being drilled (large Ø slow speed, small Ø faster speed). The drill motor is then advanced into the concrete surface at a steady pace until desired core depth is reached. Careful control of the drilling pressure is required to prevent the core barrel jamming in the hole during drilling. At the required depth the core barrel can be extracted, and the motor switched off. The drill stand shall be removed, and the core can be extracted from the surface using hand tools.

Cores should be clearly marked with sample reference, orientation before being bagged up and returned to the laboratory for testing (if required).

The concrete is reinstated as per the reinstatement methodology outlined below.

1.3.5 Reinstatement procedure

Where required reinstatement of test & sampling areas shall be carried out using FOSROC cementitious repair mortar.

Material shall be mixed in accordance with manufacturer's instructions and applied by hand. Where material is to be placed overhead the substrate should be well prepared to give a good key, where possible the exposed substrate surface should be slightly undercut with percussive drill to aid bonding. Material shall be mixed on an absorbent drip tray whilst wearing appropriate PPE (Dust mask PP3, and gloves suitable for wet concrete). Surplus material shall be bagged up and disposed of. If plaster was present then this should be reinstated as well.

1.4 Program

The tendering contractor should verify their anticipated lead in period following an instruction as well as the anticipated survey period. They should also qualify any Tender with the assumptions made to facilitate completion of the survey and delivery information.

Prior to commencement the tender contractor should provide a programme breakdown defining survey activities, locations and timings where the activities are to take place. It is anticipated that some activities will require further coordination with the building manager/occupiers.

The existing development is fully occupied and for Tender purposes the tendering contractor should base their costs on the assumption that all the investigative works are completed during 'out of office' working hours 08:30 – 17:00 or at weekends. If weekend working is proposed then this is to be clearly stated within the tender returns.

1.5 Access Notice

The survey methods adopted shall be such as to cause minimum disturbance to the occupants and the building fabric. It should be noted that, all opening up work shall be made good to the same standard and appearance to that prior to the work commencing.

The contractor shall liaise closely with the Building Manager throughout the duration of the work and Coordinate all aspects of the survey with them. All investigations that are not completed during an 'out of hours' shift are to be left in a safe state that does not compromise the ability of the occupants to go about their normal working practice. Any works not completed by the end of shift are to be notified to the Building Manager.

In the event that there are unexpected access restrictions that affect the survey works during the contract the Contractor should make best endeavours to manage the contracted works to maintain the contract programme.

1.6 Access and Equipment

The Specialist Surveyors should establish, define and include for the necessary access equipment to complete the survey works. It is anticipated that the surveys may require mobile platform or other access. Allowances should be considered in Tender submission for any specialist equipment required to complete the surveys.

In addition, the Tender Contractor should identify any potential access restrictions that may affect the operations of the building or surrounding environment.

1.7 CDM

For the purposes of the works, it assumed, in accordance with the CDM regulations 2015 that the survey Contractor will be the Principal Contractor. As Principal Contractor the Tenderer shall submit supporting information to show that they have demonstrable skills, knowledge and experience within their organisation to fulfil the role in a manner to manage and secure the health and safety of any person affected by the project.

If during the works the Contractor uncovers asbestos based materials he should prevent any further access to the affected area or allow disturbance or removal of suspect materials. The Contractor shall give notice to the Facilities Manager so that the appropriate notifications and processes can be put in place to manage the risk.

1.8 Pre-Construction Information

The principal work package of information is included within Appendix A of this document, comprising relevant information pertinent to the site. An asbestos survey for the building should be available and the Contractor should be aware of the contents prior to the Tender submission and verify that the level of information provided is satisfactory. Further asbestos information is to be discussed with the Client at a pre-start meeting, and locations of the investigations are to be discussed with the Building Manager.

If further information is required to complete the survey then this should be qualified in the Tender submission document or raised via an information request to the project manager.

1.9 Insurances

The Contractor's insurance policies should be submitted prior to Tender, for review. These should define the extent of the Public Liability cover and Professional Indemnity Insurance.

If any event occurs which may give rise to any claim or proceeding in respect of loss or damage or to persons or property arising out of the works, the Contractor shall immediately give notice to the Client and insurers. The Contractor shall indemnify the Client against any loss which may be caused by failure to give such notice.

2.0 Deliverables

2.1 Reporting

All reports and documents should be made available to the Client for their sole use.

The results of the surveys and testing are to be summarised in an A4 colour interpretive report. A total of 2 hard copies of the report shall be provided along with a CD containing all of the information both in PDF and the native file formats.

Any intrusive works that expose structural elements that exhibit signs of significant degradation should be brought to the attention of the Engineer immediately for further assessment.

The report shall be made available no later than 2 weeks from completion of the survey.

3.0 Tender Returns

The Tender return should be based upon a lump sum of the defined Works with a breakdown of costs for the key elements of the Works:-

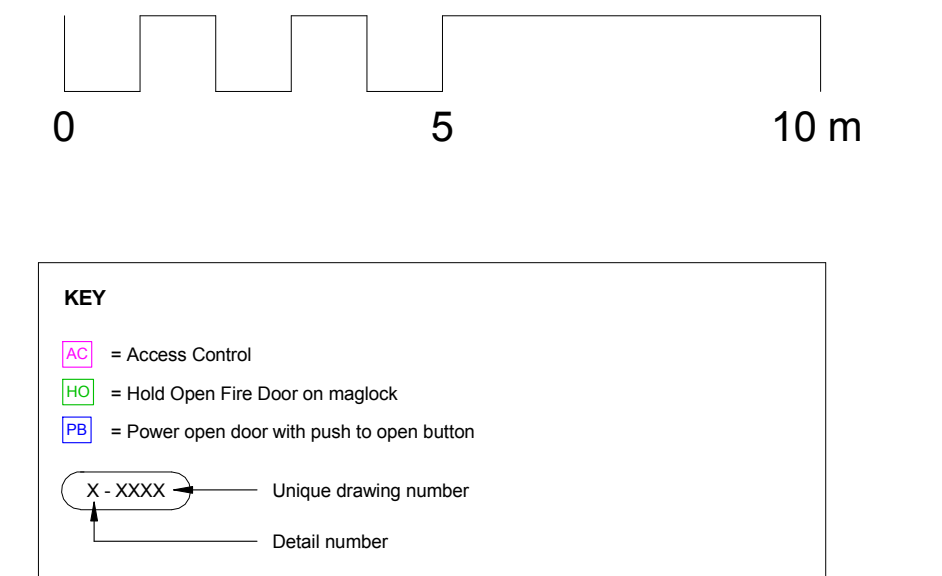
The Tenderer should provide a breakdown of costs defining rates for the sampling and testing for each form of intrusive test. In addition to this a schedule of day rate allowances for out of hours working should be included, with a breakdown of costs identifying attendances to complete each activity.

Any restrictions, assumptions that are perceived that may affect Tender price or Works should be qualified in the Tender.

5.0 Appendices

Appendix A Survey extents and scope

Investigation Locations



Our Locations

Birmingham

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