CHOICE OF 'STABILITY TIES'

SCAFFOLD STABILITY TIES CAN BE ARRANGED INTO TWO CATEGORIES : MECHANICAL & NON-MECHANICAL

MECHANICAL TIES ARE POSITIVELY FIXED TO A STRUCTURE VIA A 'MECHANICAL' CONNECTION. EG SCREW CLAMPED TO STEELWORK, BOLTED TO COLUMNS/ BEAMS OR PURLINS, ANCHORED TO CONCRETE, STONE OR BRICKWORK ETC……

NON MECHANICAL TIES ARE FIXED BEHIND, AROUND OR THROUGH A STRUCTURAL COMPONENT OF A BUILDING EG AROUND A COLUMN, THROUGH & BEHIND WINDOW OPENINGS, OVER OR AROUND A WALL ETC…

FOR THIS PROJECT NON MECHANICAL TIES WERE RULED OUT DUE TO THE LACK OF AVAILABLE CONNECTION POINTS; ALL WINDOWS & DOORS NEEDED TO REMAIN IN USE, NO EXPOSED STEELWORK WAS AVAILABLE AND NO WALLS OR COLUMN EDGES ARE AVAILABLE FOR TYING AROUND / OVER.

CHOICE OF MECHANICAL TIES: DUE TO LACK OF STEELWORK OR CONCRETE THE USE OF SCAFFOLD ANCHORS INTO THE MASONRY WALLS WAS THE ONLY OPTION. THE TYPES OF MASONRY ANCHOR TIES AVAILABLE ARE AS FOLLOWS: RESIN ANCHORS, ANCHOR 'PLUGS' (STEEL OR PLASTIC), 'SELF-TAPING' ANCHORS. RESIN ANCHORS HAD TO BE RULED OUT DUE TO THE UNKNOWN WALL CONSTRUCTION (POTENTIAL HOLLOWS/CAVITIES BEHIND THE OUTER SKIN) THIS LEFT THE CHOICE OF TWO TYPES OF ANCHOR TIE: PLUG OR 'SELF-TAPING' AS FOLLOWS:

PROCESS FOR CHOICE OF ANCHOR TIES TO RESTRAIN THE SCAFFOLD:

A SCAFFOLD WITH NO STABILITY TIES REQUIRES THE WIDTH OF THE STRUCTURE TO BE SUBSTANTIALLY INCREASED TO ENSURE THAT THE BASE TO HEIGHT RATIO IS SUFFICIENT TO ACHIEVE STABILITY. THE NEED FOR A TEMPORARY ROOF OVER THE EXISTING BUILDING ALSO RESULTS IN VERY HIGH HORIZONTAL LOAD REACTIONS AT EAVES LEVEL (AS THE TEMPORARY ROOF IS REQUIRED TO SUPPORT THE SAME IMPOSED LOADS AS THE PERMANENT ROOF). THE OUTCOME OF THESE REQUIREMENTS MEANS THAT DESIGNING A FREESTANDING SCAFFOLD WOULD REQUIRE THE SCAFFOLD TO PROJECT AN EXCESSIVE DISTANCE OUTWARDS FROM THE BUILDING WALLS. RESULTING IN VAST AMOUNTS OF SCAFFOLDING MATERIAL AND HUGE AMOUNTS OF COUNTERWEIGHTS.

THEIR WERE MANY PRACTICAL & COMMERCIAL REASONS WHY INSTALLING SUCH A LARGE SCAFFOLD WOULD NOT BE POSSIBLE. HOWEVER, THE PRIMARY REASONS WERE THAT; THE WAREHOUSE NEEDS TO BE KEPT IN USE & A FREESTANDING SCAFFOLD WOULD RESULT IN BLOCKING ACCESS & EGRESS REQUIREMENTS, FOR SURROUNDING PAVEMENTS, SERVICE ROADS & FIRE ESCAPES FOR MUSEUM USERS, NEIGHBOURING BUSINESSES & MEMBERS OF THE PUBLIC.

THEREFORE THE OUTCOME OF THE STUDY AGREED THAT THE MOST PRACTICAL METHOD OF CONSTRUCTING THE SCAFFOLD IS TO USE THE EXISTING BUILDING FOR STABILITY BY SECURING 'TIES' TO THE EXISTING STRUCTURE.

GENERAL NOTES

A This drawing & any associated documents are the property of……SCIENCE MUSEUM GROUP…… The drawing is confidential and it and the copyright therein are the property of P.B.S.D. Ltd.

B Scaffold to be constructed in full compliance with NASC documents TG20:21, SG4:15 and all relevant statutory regulations, by suitably qualified & competent operatives.

C Scaffold built from steel tubes and steel fittings conforming to BS EN39 and BS EN74, unless noted otherwise.

D All Timber scaffold boards used are to be 225mm x 38mm thk in accordance with BS2482 unless noted otherwise.

E Scaffold to be constructed using load bearing fittings throughout, except when fixing intermediate bearers directly below platform levels and securing boards or toeboards.

F This drawing has been prepared from details supplied to us by the enquirer/client who should check that we have correctly interpreted their requirements and that all loadings, dimensions, details, and erection sequences are correct and practicable. Any changes to the design required due to the absence of detailed information or a suitably completed 'Design-plan' will be at their cost.

G The client is to prepare and ensure that any foundations/supports are suitable for supporting the loads imposed upon it by the scaffold including its work load.

H No sheeting, wind protection or fans, (unless already shown) are to be added to the scaffold structure detailed on this drawing without prior reference to P.B.S.D. Ltd.

J The enquirer/client is to ensure that adequate facilities for tying or anchoring the scaffold are made available and that the structure, building, ground or concrete to which the scaffold is tied or anchored is capable of withstanding the Additional imposed loads.

K No ties or braces are to be removed or any modifications to be made to the scaffold without prior reference to P.B.S.D. Ltd.

L The enquirer/client is to design, supply and fix all necessary auxiliary equipment and is to ensure that such auxiliary equipment is capable of safely transmitting the loads to the scaffold tubes.

M The enquirer/client will be responsible for setting out and critical working levels of scaffolding or similar equipment used as a system of support.

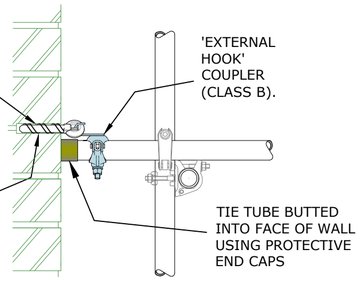
N All dimensions are as stated or as calculated. Drawings must not be scaled.

O All working platforms must at all times be in compliance with relevant statutory regulations.

P The Construction (Design & Management) Regulations 2015, require that work cannot begin until the client is aware of and understand their duties outlined in the above mentioned regulations. These duties are detailed in the approved code of practice "Managing Construction for Health + Safety" or contact P.B.S.D Ltd. for specific advise.



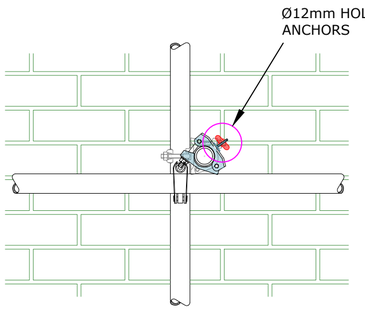
EXCALIBUR 12mm DIA 'SELF TAPING' EYEBOLTS



PROPOSED ANCHOR TIE OPTION 1

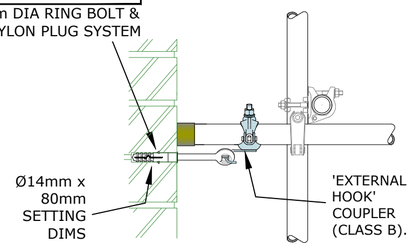
SELF TAPING - EXCALIBUR RING BOLT





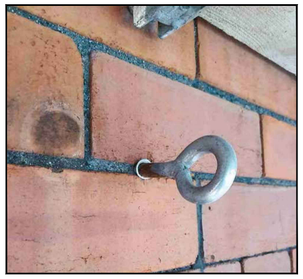


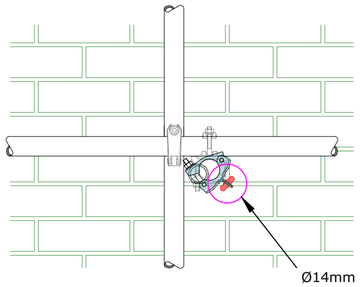
12mm DIA RING BOLT & NYLON PLUG SYSTEM



PROPOSED ANCHOR TIE OPTION 2

APOLLO NYLON ANCHOR PLUG & RING BOLT





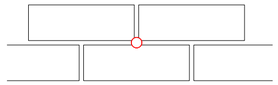
SCAFFOLD ANCHOR INSTALLATION:

ANCHORS SHOULD BE INSTALLED ONLY BY COMPETENT INSTALLERS – USING THE CORRECT TOOLS AND STRICTLY IN ACCORDANCE WITH THE ANCHOR MANUFACTURER'S INSTRUCTIONS.

WHEN DRILLING INTO BRICKWORK THE ANCHOR SHOULD IDEALLY BE LOCATED IN THE SOLID PORTION OF THE BRICK RATHER THAN INTO THE MORTAR JOINT. IF HOWEVER ANCHORS MAY NOT BE FIXED INTO THE BRICKS THEMSELVES E.G. AS A RESULT OF A CONSERVATION ORDER, THEN THE FOLLOWING APPROACH MAY BE SANCTIONED BY THE RESPONSIBLE ENGINEER IF APPROVED BY THE MANUFACTURER:

-CHOOSE AN ANCHOR WITH A DIAMETER SIGNIFICANTLY LARGER THAN THE WIDTH OF THE MORTAR JOINTS, e.g. 14mm IN A 10mm JOINT.
-FIX INTO THE BASE OF THE JUNCTION BETWEEN BED AND PERPENDICULAR JOINTS
-PRELIMINARY TESTS MUST BE CARRIED OUT BUT WITH AN INCREASED RATE OF 1 IN 10 OF THE WHOLE JOB.

IF TIE LOADS CAN NOT BE ACHIEVED IN MORTAR JOINTS, THEN INEVITABLY THE FIXINGS WILL NEED TO BE LOCATED DIRECTLY INTO SOLID PORTION OF THE MASONRY





SCAFFOLD ANCHOR TESTING:

DRILLED IN ANCHORS USED TO TIE SCAFFOLDING TO A BUILDING STRUCTURE. SHOULD BE LOAD TESTED TO THE REQUIREMENTS OF THE NASC DOCUMENT TG4:19. MAXIMUM 'WORKING' ANCHOR LOAD ON THIS PROJECT = 7.50kN

"PRELIMINARY" TESTS ARE USED TO CHECK SUITABILITY OF A PARTICULAR FIXING IN THE BASE MATERIAL AND TO DETERMINE ALLOWABLE LOADS. THE APPROACH IS TO TEST A SERIES OF 5 SAMPLE ANCHORS TO A LOAD WHICH DEMONSTRATES A SATISFACTORY SAFETY MARGIN AND THEREBY, IF POSSIBLE, AVOID TESTING FIXINGS TO FAILURE.

"PROOF" TESTS ARE NEEDED TO CHECK THE QUALITY OF INSTALLATION OF THE CHOSEN ANCHORS. THEY SHOULD BE CARRIED OUT ON ALL PROJECTS. A SAMPLE OF ANCHORS TO BE USED SHALL BE TESTED TO A LOAD OF 1.25 TIMES THE WORKING LOAD. A MINIMUM OF 3 ANCHORS SHALL BE TESTED AND AT LEAST 5% (1 IN 20) CHOSEN AT RANDOM AND SPREAD EVENLY THROUGHOUT THE WHOLE JOB. ALL ANCHORS THAT HAVE BEEN PROOF LOADED SHOULD BE CLEARLY IDENTIFIED WITH A TAG SHOWING THE DATE OF TEST AND THE TEST LOAD, ANY ANCHORS FAILING THE TEST SHOULD BE TAGGED AS SUCH.THE FAILURE OF AN ANCHOR IN PROOF TESTING IS A SERIOUS ISSUE AND REQUIRES THE INVESTIGATION OF THE CAUSE(S) OF FAILURE AND AN INCREASE IN TESTING RATE.

SITE TESTS SHOULD BE CARRIED OUT BY SUITABLY COMPETENT PERSONNEL (OTHER THAN THE ACTUAL INSTALLER OF THE FIXINGS) USING A TEST METER WITH A GAUGE CALIBRATED WITHIN THE LAST TWELVE MONTHS TO AN ACCURACY OF < 5%. EQUIPMENT SHOULD APPLY THE LOAD TO THE ANCHOR AND BE ARRANGED SUCH THAT THE REACTION LOADS ARE TAKEN SUFFICIENTLY FAR FROM THE ANCHOR SO AS NOT TO INFLUENCE THE RESULT, TYPICALLY THIS MEANS ENSURING THE FEET OF THE BRIDGE DO NOT REST ON THE MASONRY UNIT BEING TESTED.



SCAFFOLD ANCHOR REMOVAL & REPAIR:

ANCHORS SHOULD BE REMOVED PROGRESSIVELY WITH THE SCAFFOLD DISMANTLE, BY COMPETENT PERSONS IN ACCORDANCE WITH THE SCAFFOLD R.A.M.S. THE TWO TYPES OF RECOMMENDED ANCHORS CAN BE REMOVED BY UNSCREWING. THE REMAINING HOLE CAN THEN BE REPAIRED AS FOLLOWS:

- 'SELF TAPING' EXCALIBUR RING BOLTS. NOTHING IS LEFT BEHIND IN THE WALL, THEREFORE THE HOLE CAN BE REPAIRED BY RE-POINTING (WHERE ANCHORS ARE INTO JOINTS) or IF ANCHORS HAVE BEEN INSTALLED INTO THE SOLID BRICK, THE BRICK DUST WILL BE SAVED AND THE HOLE REPAIRED USING ACRYLATE RESIN ALONG WITH SPECIALIST BRICK TINTING TECHNIQUES, OFFERING A PERMANENT REPAIR.

- 'NYLON' PLUG & RING BOLTS. THE NYLON PLUG REMAINS IN THE WALL BUT WILL NOT CORRODE. FOR REPAIRS INTO MORTAR OR BRICK THE 'VISIBLE' FRONT PART OF THE THE PLUG WILL NEED TO BE 'DRILLED OUT' THEN THE HOLE CAN BE REPAIRED AS DETAILED ABOVE.



TIE OPTION 3

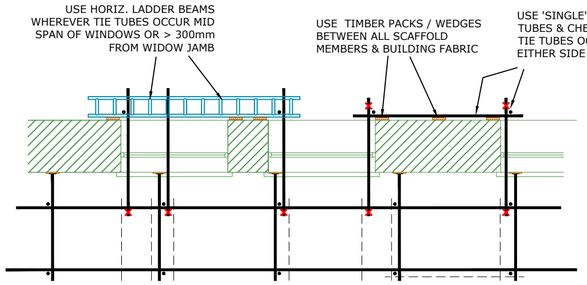
POTENTIAL NON MECHANICAL TIES

DETAIL OF POTENTIAL BOX TIES FOR USE WHERE ANCHOR TIE LOADS CAN NOT BE ACHIEVED AT BUILDING EAVES LEVEL ONLY!.

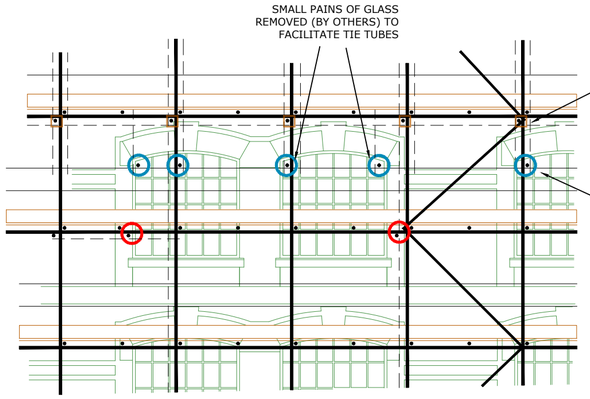
- BOX TIES INSTALLED THROUGH THE WINDOW PANES & AROUND THE MASONRY 'PIERS'.

- GLAZING REMOVED, THEN REINSTALLED & MADE GOOD BY OTHERS IN ACCORDANCE WITH RESTORATION SPEC.

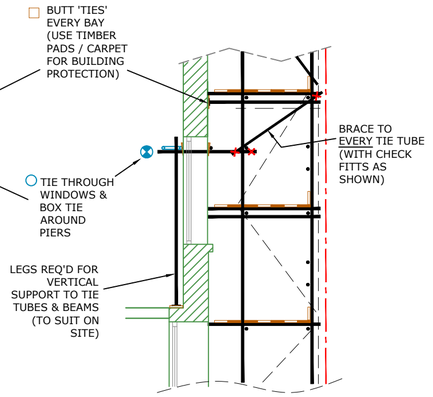
- TIMBER PACKERS / WEDGES TO BE USED BETWEEN ALL SCAFFOLD MEMBERS & BUILDING FABRIC



PART PLAN



PART ELEVATION



SECTION

APPROACH TO ENSURE SAFE FIXINGS

Check structure will support required loads

Choose an anchor suitable for the base material

Know the working load

Concrete: Check working load is lower than recommended load

Masonry: Do preliminary tests as required in section 6.1

Chosen anchor to be installed by Competent Fixings Installer

Sample of anchors on *every job* to be proof tested by Competent Fixings Tester as section 6.2

THIS DRAWING TO BE READ IN CONJUNCTION WITH THE FOLLOWING DRAWINGS:

SMG7446-00-01 ; SCAFFOLD G.A. FOR TENDER
SMG7446-00-02 ; SCAFFOLD ERECTION PHASING.
SMG7446-00-03 ; TEMP. ROOF OVER ENTRANCE
SMG7446-00-04 ; BRIDGE OVER RESTAURANT

REV.	DESCRIPTION	DRAWN	DATE

SCIENCE MUSEUM GROUP

CLIENT: SCIENCE & INDUSTRY MUSEUM, M/CR

SCIENCE MUSEUM GROUP

TITLE

NEW WAREHOUSE PROJECT

PROPOSED SCAFFOLD ANCHOR ARRANGMENTS

SCAFFOLD DESIGN LTD
P.B. SCAFFOLD DESIGN LTD.
CENTURY OFFICES,
2175 CENTURY WAY,
THORPE PARK,
LEEDS,
LS15 8ZB
t: 0113 3900150
e: info@pbscaffolddesign.co.uk

DATE:	DRAWN BY:	APPROVED BY:
13/09/23	R.Park	P.J.B

SCALE	DRAWING No.	REV.
(A2) N.T.S	SMG7446-00-05	