

## Hub H&S campaign – Work at height (Apr 18)

# SUPPORTING NOTES

BMV JV

M5/J1-2 Oldbury Viaduct Renewal Scheme

### Introduction



BAM Nuttall / Morgan Sindall / Volker Fitzpatrick Joint Venture (BMV JV) is delivering the largest concrete repair project (by value) ever carried out in the UK on the M5 Oldbury Viaduct scheme in the West Midlands. This elevated section of motorway cuts through the mixed industrial and residential Sandwell conurbation with up to 320,000 residents and thousands of businesses, all relying on the Strategic Road Network for economic success.

BMV JV is working on replacing the waterproofing system to the 3km length of the elevated M5 Motorway between Junctions 1 and 2 that was originally built in the late 1960s. The refurbishment works is being carried out 24/7 and includes: concrete repairs, removal of asbestos from concrete joints, and installation of new drainage, lighting and signage systems, technology and communication systems and central reserve concrete safety barrier

A scheme of this scale will inevitably impact traffic flows in the area, with the works having the potential to create unprecedented regional traffic disruption. Scheduled completion of carriageway works is planned for late 2018, with associated works continuing until spring 2019.

Access to areas beneath the M5 Oldbury Viaduct structure has been provided by tube and fitting scaffolding and HAKI staircases, with all scaffolding works undertaken by Lyndon Scaffolding plc.

This H&S campaign > provides summary details of works undertaken by Lyndon Scaffolding, including types of scaffolding, together with examples of safety systems of work, guidance notes, tool box talks, and induction modules and other videos used by the team from Lyndon Scaffolding.

In addition, details of key learning and innovation recognised by BMV JV and Lyndon Scaffolding, introduced following a fall from height injury to a Scaffolder that occurred in Sep-17, is also included.



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Scaffold Quantities
400 miles of scaffold tube. 500,000 scaffold fittings. 80,000 scaffold boards. 4,000 alloy beams. Average of 45 CISRS directly employed, trained and competent scaffolders employed over a 12 month period (to erect and maintain scaffolding). Supervision ratio of 1 Non-working Supervisor to up to 12 scaffolders. Full time use of supporting vehicles and plant including 3 x HGV demounts delivering materials daily to site, with 2 Telehandlers and 1 Sideload vehicle distributing materials to each scaffold location.



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Scaffold types - Birdcage



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Scaffold types - Bridged





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## Scaffold types – Suspended Scaffolding

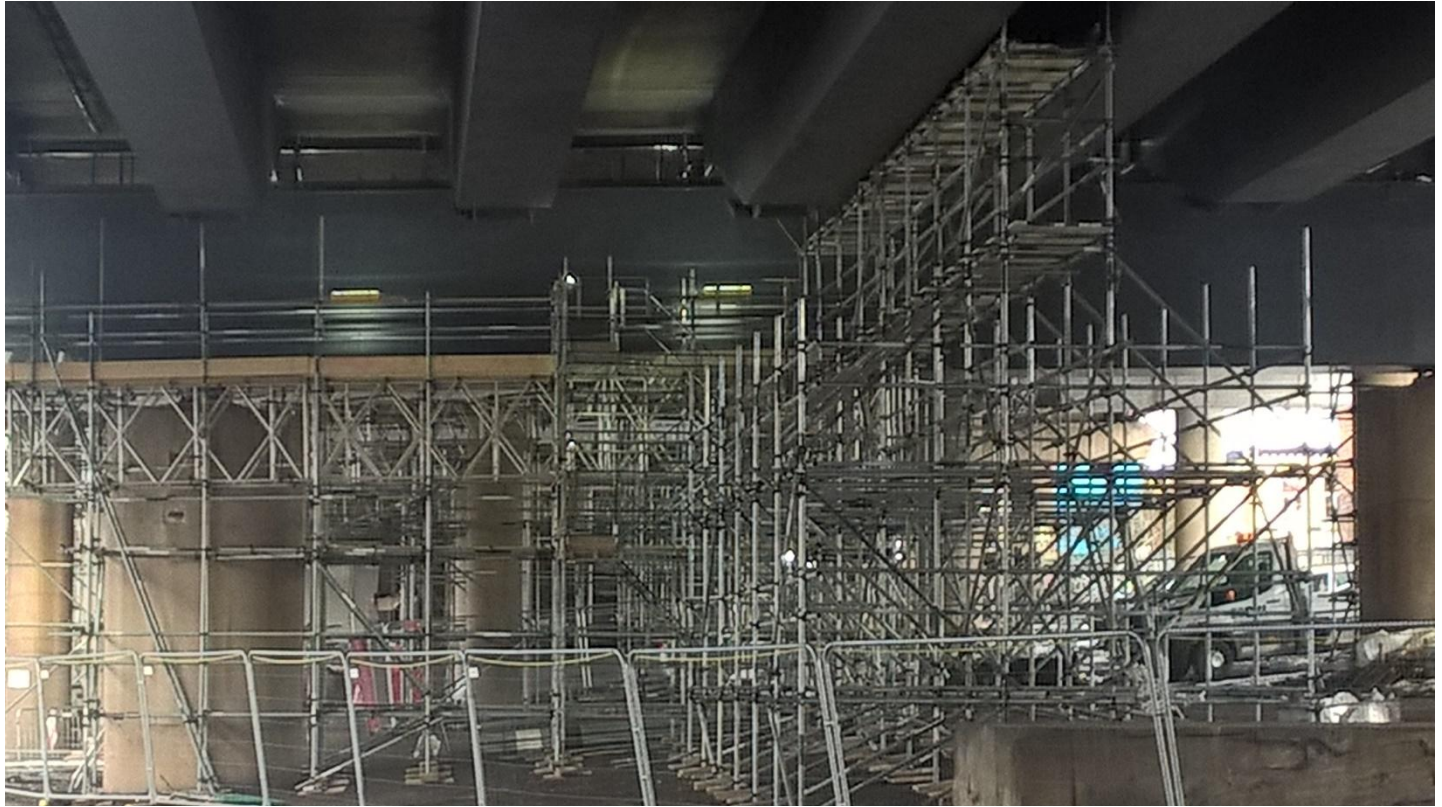


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Scaffold types – Complex





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### Access – Pedestrian and Vehicle





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### Access – Pedestrian and Vehicle





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### Access – Pedestrian





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Access – Pedestrian






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Foundations		
Poor Practice Unprepared foundations	Good Practice Prepared foundations	Best Practice Permanent foundations
		
Why change?		
<p>Scaffolds rely on suitable foundation, part of the scaffold design.</p> <p>Client responsible for providing suitable foundations.</p> <p>Unprepared foundation result in a foreseeable risk of trips and slips.</p> <p>Simplifies the erection and dismantle of the scaffold.</p> <p>Permanent foundations where it is foreseeable that scaffold access will be required in the future</p>		



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### Risk Assessments and Method Statement (RAMS)

#### Before

##### Erection procedure

- i. Materials will be transported to site and stored in an agreed location.
- ii. Operatives will establish a Lyndon exclusion zone (barriers and signs) to prevent 3<sup>rd</sup> party access.
- iii. Operatives will transport materials into the exclusion zone, storage to be subject to good housekeeping.
- iv. Operatives will commence scaffold erection in accordance with their CISRS training, when the 1<sup>st</sup> bay is erected an "incomplete" scaffold sign or similar will be displayed on the scaffold. As the means of access onto the lifts is erected an "incomplete" scaffold sign or similar will be displayed adjacent to the points of access, 3<sup>rd</sup> party access will be restricted by physical barriers.
- v. Whilst erecting further lifts, operatives will work from a NASC SG4 safe zone, when working outside of the safe zone i.e. when establishing or moving the safe zone, operatives will work in accordance with NASC SG4, the Safety Step will be the preferred means of achieving collective protection.
- vi. The means of access (staircase, ladder access etc.) will be erected progressively with the scaffold, the gap in the guardrail at external/ internal ladder access points will be closed using a Lyndon safety gate.
- vii. The means of tying the scaffold will be erected progressively with the scaffold, ties will be clearly identified by tie tags.
- viii. Where drilled anchors are used, Operatives drilling to install anchors will wear P3 RPE unless personal monitoring has determined that the risk is low.
- ix. Drilled anchors will be progressively tested in accordance with NASC TG4, testing will be documented.
- x. On completion, all spare materials will be cleared from the scaffold/work area and stored in an agreed position or removed from site.

##### Hand over procedure

##### Construction Compliance inspection

- i. On completion of the scaffold, the Chargehand will carry out a construction compliance inspection to ensure that the scaffold is ready for its hand over inspection. The result is recorded on a construction compliance certificate.

##### Hand over inspection

- i. On satisfactory completion of the construction compliance inspection, the Scaffold Inspector will undertake a methodical hand over of the scaffold in conjunction with the client to ensure that the scaffold as erected complies with the agreed scaffold specification.
- ii. On satisfactory completion, the result is recorded on a hand over certificate and scaffold tag, the hand over certificate is issued to the customer.

##### Schedule 7 inspection procedure

- i. The Scaffold Inspector will inspect the scaffold in accordance with the requirements of The Work at Height Regulations 2005 and record the findings on the scaffold inspection tag and the schedule 7 inspection record.
- ii. Minor issues may be rectified at the time of inspection, major issues or repetitive issues will be recorded on an unsafe scaffold report, for action by the customer.

##### Dismantle procedure

- i. The Chargehand will initially inspect the scaffold to ensure that it is structurally sound and it is suitable to be dismantled i.e. ties and braces are still in place, platforms are clear of debris etc. If debris is still present the scaffold must be returned to customer for remedial action.
- ii. When we are satisfied that the scaffold is safe to dismantle, Operatives will establish a Lyndon exclusion zone (barriers and signs) and will place incomplete scaffold signs or similar at the points of access onto the scaffold, 3<sup>rd</sup> party access will be restricted by physical barriers.
- iii. The scaffold will be dismantled in accordance with their CISRS training, generally in the reverse order to the erection procedure.
- iv. Whilst dismantling further lifts, operatives will work from a NASC SG4 safe zone, when working outside of the safe zone i.e. when establishing or moving the safe zone, operatives will work in accordance with NASC SG4, the Safety Step will be the preferred means of achieving collection protection.

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### Risk Assessments and Method Statement (RAMS)

#### After

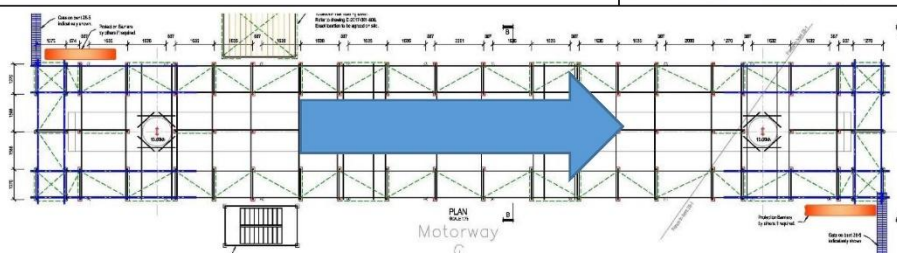
##### Erection method

- On completion of the advance guardrail and before the movement of scaffold boards from the Scaffolders Safe Zone, the Scaffolder will clip on above head height onto the scaffold structure via their safety harness and lanyard.
- The Scaffolder will now reposition the scaffold boards from the Scaffolders Safe Zone, to form the Scaffolders Safe Zone on the next working lift.
- As the Scaffolder moves across the width of the scaffold, the Scaffolder will need to reposition their attachment point using their twin tail lanyard.
- The Scaffolder will be clipped on at all times during the movement of any scaffold boards that form the Scaffolders Safe Zone.



##### Boarding out method

- The Scaffolders Safe zone will be boarded with scaffold boards running the length of the scaffold structure, as shown by the arrow on the image below.
- Each set of boards being completed across the width of the scaffold, before the next set of scaffold boards are placed.
- Boards are not to be lapped in this direction.



#### Why change?

“A picture can paint a thousand words”

Text based RAMS, changed to Text and Picture based RAMS.

A Scaffolder does not need to interpret the written safe working practice, the picture clearly shows it.

Photograph (top right) shows arrangements in accordance with SG4:15, prior to adoption of the Enhanced SG4 Safe Zone which now includes the provision of an intermediate 2<sup>nd</sup> guardrail.

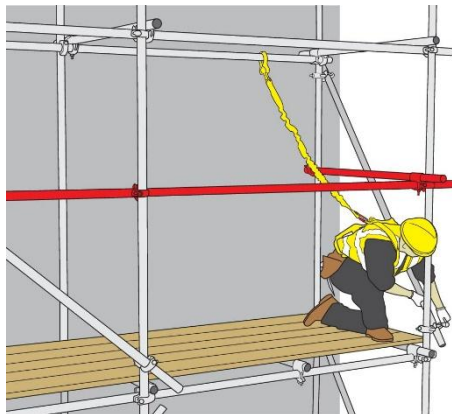


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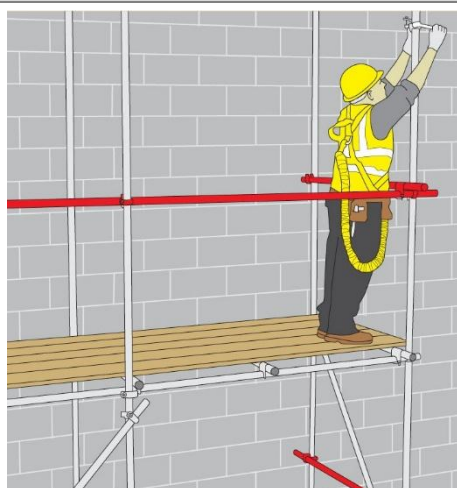
### Enhanced SG4 Safe Zone – introduction of an intermediate 2<sup>nd</sup> guardrail



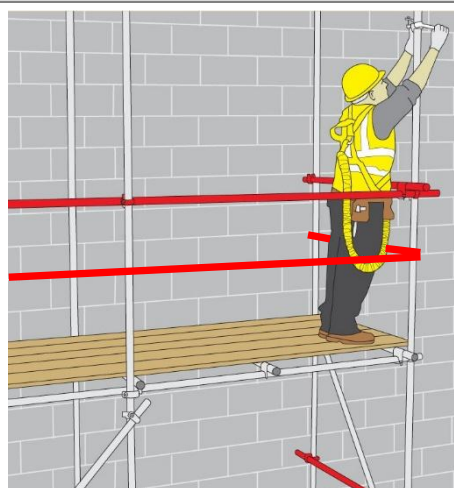
A Scaffolder will at times have to reach below the level of the single guardrail i.e. to fix bracing or receiving scaffold materials.

When knelt, the Scaffolder is at risk of falling and is clipped on with his lanyard to the scaffold structure.

**Before**



**After**




### Why change?

By introducing the intermediate 2<sup>nd</sup> guardrail, the decision when to clip on or not to clip on is removed from the Scaffolder, this simplifies their method of work

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Twin Retractable Lanyards		
NASC SG4 Minimum	Lyndon Minimum - Before	Lyndon Minimum - After
		

### Why change?

NASC SG4 requires the use of at least a single lanyard.

Lyndon upgraded this requirement to a twin tailed lanyard, as this provided the user with greater flexibility when working outside of a NASC SG4 Safe Zone.

The twin retractable provides enhanced protection for the user.

Arrests the fall quicker.

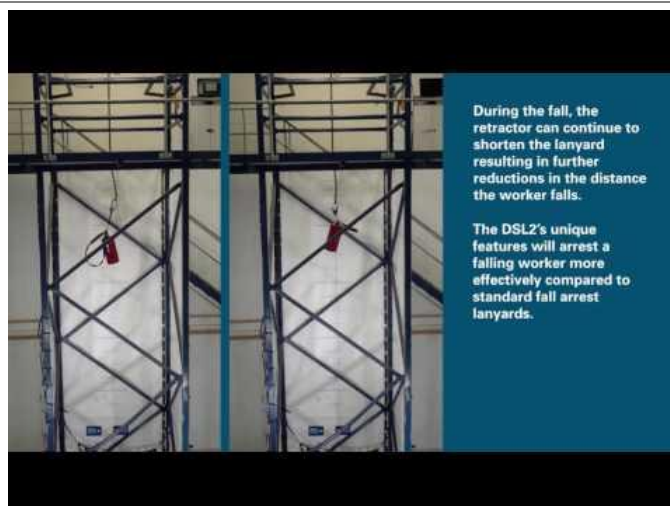
Keeps the potential fall distance to a minimum by automatically retracting making the lanyard always as short as possible.

Compact design, not as cumbersome to use when compared to a non-retractable twin tailed lanyard.

Exceeds the requirements of EN 355 by more than 50%.

Trials undertaken by Scaffolders on the M5 Oldbury Viaduct scheme in the 4<sup>th</sup> Quarter 2017 proved successful with users also commenting that they were also more comfortable to wear than the standard harness and twin tail lanyard previously supplied.

Spanset DSL2 video clip demonstrating the reduction in fall distance

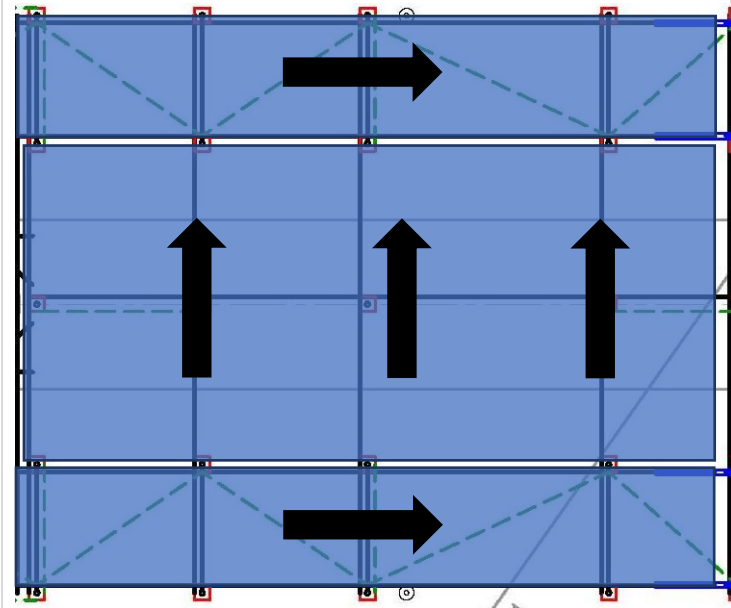
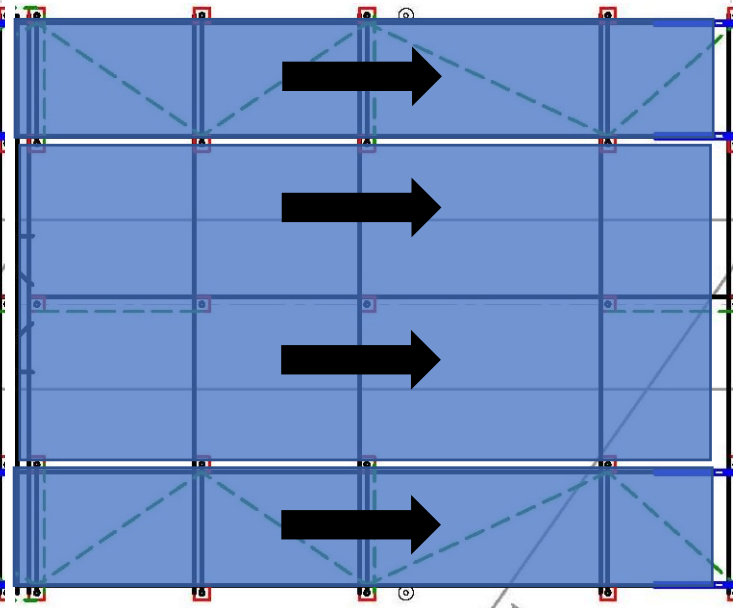




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Same direction boarding	
Before	After
	
Why change?	
<p>Both ways of boarding are acceptable methods of working.</p> <p>Boarding in the same direction can reduce the lapping of the scaffold boards, the platform steps and trip hazards.</p> <p>A single boarding standard simplifies the method of work and the Scaffolders understanding of that method of work</p>	

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Clipping On	
<p>Documentation attached relating to the important topic of clipping on includes as follows and is provided for information and reference.</p> <ul style="list-style-type: none"><li>• Appendix 01 - Lyndon PPT, Review of clipping on [Dec 17], produced following a fall from height injury sustained on the M5 Oldbury Viaduct scheme in September 2017. The content provides an honest appraisal and review by trained and competent scaffolders regarding “clipping on” by scaffolders during erection and dismantling of scaffolding</li><li>• Appendix 02 - Lyndon TBT088 NASC Safety Guidance Note SG4-15</li><li>• Appendix 03 - SpanSet Twin Leg Hybrid Lanyard (FAR-11G10)</li></ul>	



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### Emergency Fall Recovery Exercise

#### Key Components – GOTCHA Loop

Those of a certain age may remember The Sun's infamous jingoistic headline "Gotcha", when HM Submarine Conqueror sank the Argentine light cruiser General Belgrano during the Falkland's War in 1982



Today "Gotcha" would be way too politically incorrect (It was at the least bloody insensitive in 1982) and Facebook and Twitter would melt down as outraged and offended key board warriors scream "not in my name" and compete to be even more indignant than the previous post...

Anyway, this is about the Spanset Gotcha Suspension Loop, a most useful bit of kit that needs revisiting and not about a dodgy headline from another age.

We bought the Gotcha loops in those first heady days of "Suspension Trauma", when the safety world lost its collective plot and spent hundreds of thousands of pounds fixing a problem that didn't exist. Even today we still come across safety folk and others who really should know better, earnestly telling us that you will die horribly if you hang in your harness post arrested fall for 2, or 5, or 7 minutes etc. We were also told you must be kept in a squatting position after rescue, or the pooled toxic blood will rush to your brain and you will die a jabbering idiot.

Except; it was all bollocks and after HSE carried out detailed research, non-existent Suspension Trauma became known as pre syncope and we went back to following the correct standard first aid advice and put an unconscious tumbler into the recovery position. {Pre syncope symptoms: You are not unconscious, that's full on syncope, but may be lightheaded, dizzy, feel sick, sweaty, headache, feel disorientated, irregular heart beat etc. It's caused by a loss of oxygenated blood to the brain and symptoms can be experienced after 5 to 10 minutes of suspension post arrested fall.

You **must** have a robust rescue plan in place, in case despite all the effort and training to ensure scaffolders work to SG4 and properly utilise collective protection; someone does have an arrested fall and is then hanging miserably in their harness.

Let's put some perspective and reality in here straight away. Since we first started working to SG4 back in 2000, with over 500 lads employed on average each year, we have *no* recorded instances of real life arrested falls or the use of retriever equipment for rescue.

However, we really do need to know what to do and how to do it in case the fall *does* happen, and that's why we have a Fall Recovery / Rescue Plan for *each* job. You have to get the faller down quickly & safely. (We aim for a *maximum* of 5 minutes post arrested fall suspension).

If you do take an arrested fall it will hurt, a lot. The shock absorber in the impact absorbing lanyard will reduce the forces being applied to your body to survivable levels; but, you are going to be very sore and bruised and the romantic evening in will be on hold for several weeks....but you will be alive and you will need retrieving as quickly as possible.

Our standard recovery kit is the IKAR Retriever inertia fall arrest block – The "Retriever Block". The retriever block works in two ways: As an inertia reel fall arrester *and* as a retriever winch which is used to retrieve a person suspended in his harness post fall. More on retriever blocks later.

Now we know from practice rescues carried out on site that hanging in your harness is uncomfortable at best; at



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### Emergency Fall Recovery Exercise

#### Key Components – GOTCHA Loop

worst if you haven't adjusted the leg straps correctly and they are too loose, it can become intensely bloody painful around your bloke bits....

A way to *immediately* stabilise the rescue operation and make eventual retrieval a lot less uncomfortable is to *immediately* deploy a GOTCHA Loop from the position where the faller's lanyard is attached to the structure. If he's conscious he simply steps into the deployed loop and is now taking the weight off his leg straps.

If he's unconscious, you'll need to use the new telescopic rescue pole – "Hook a Duck"- or use a second retriever winch to lower a rescuer down to the unconscious faller. More on the new "Hook a Duck" telescopic pole later.

It makes the tumbler more comfortable and safer; he's also still attached by his lanyard to an anchorage which **must** remain securely attached, until the retriever's karabiner is attached to his harness's front "D" link. There is also an additional added bonus from using a GOTCHA Loop; it takes the immediate heat and panic out of the situation and gives the rescue team time to stop and think through the intended rescue procedure properly.

GOTCHA loops should be available on **all** sites where the rescue plan identifies a retriever inertia reel fall arrester because there is the potential for post fall suspension.

**If you've got a Retriever winch on site, you also need a GOTCHA Loop!! And the Gotcha loop must be on the scaffold with you where you are working, you cannot quickly use it if it is sat in the van.**

### Emergency Fall Recovery Exercise

#### Key Components – Retrievers

Not the slobbering, smelly, hairy kind that brings you a shoe or cuddly toy, sits on your foot, breaks wind and looks at you accusingly.... (Yup, got one in the family as well!).





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### Emergency Fall Recovery Exercise

#### Key Components – Retrievers

The retriever here is the IKAR retriever inertia fall arrest block, our standard method of retrieving a Scaffolder post arrested fall.

We prefer it to a rope based system as you can winch a tumbler up *or* down to a place of safety.

With a rope based system you can only lower the poor sod down!



A. Fall arrest position



B - Retriever position



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### Emergency Fall Recovery Exercise

#### Key Components – Retrievers

C - Not fully engaged position



Read the bloody label!



The retriever block can be used in two ways:

- As a simple fall arrestor.
- As a retriever winch.

For both duties the block must be attached to an anchor point rated to at least 10kn. The block is supplied with a karabiner specifically shaped so it “locks” the block to the anchor point and helps prevent the block twisting during retrieval operations.

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### Emergency Fall Recovery Exercise

#### Key Components – Retrievers

- When using as a fall arrester, the block is used with the locking trigger in the position shown in position A. above. The retriever function does not operate and the block functions simply as an inertia fall arrest block.
- To use as a retriever winch, the locking trigger is pulled out and the handle snaps out with a distinct and audible “clunk”. As shown in position B. above.
- **Important!! Make sure the handle is fully engaged with the winch mechanism, At least 25mm of the shaft will be visible when properly engaged. See position C above, handle *is not fully* engaged with winch mechanism.**

You **MUST ALWAYS** carry out a three stage check before attempting to winch the faller up or down.

**ALWAYS** check the mechanism is properly engaged:

#### CHECK

1. Audible “Clunk”.
2. 25 mm of exposed shaft.
3. Test winch the faller upwards for a few inches. If he successfully moves up-wards, the retriever mechanism is fully engaged!!

### Emergency Fall Recovery Exercise

#### Key Components – IKAR Retractable Remote Rescue Pole (RRRP)

#### Hook a duck!

We are now going to look at the third part of the rescue kit that **You** need on **Your** site, if the specific site Rescue plan requires the use of a Retriever fall arrester.

We’ve already looked at 2 components of the rescue kit; the IKAR retriever inertia block and the Gotcha Loop. The third bit of equipment that’s needed to complete the rescue kit is the IKAR Retractable Remote Rescue Pole (RRRP). Now that’s a bit of a mouthful and sounds somewhat rude, so our lads who have used the pole have already christened it “Hook A Duck” for obvious reasons...

The difference here is you don’t win the cuddly toy or gold fish, this is for real and you hook an unconscious scaffolder who’s taken a tumble and is hanging motionless in his harness.

Fluffy loves gold fish, she can clear a bowl in 2 minutes and hide the bony bits down the back of the sofa.

Rescue of a conscious tumbler is relative simple, provided you have a rescue plan, rescue trained scaffolders and the right rescue kit... You lower the hook of the retriever block, the poor sod clips it to his front harness D link and up or down he goes.

If the faller is unconscious however it brings another level of complication to the rescue. Obviously the faller cannot attach the retriever hook to his harness as he’s bloody unconscious... So....

One method is to lower a rescuer on a second retriever winch to the faller, attach him / her to the first retriever and recover both. **BUT!!** This is very much a method of last resort, as you are now putting a second person at risk during the rescue.





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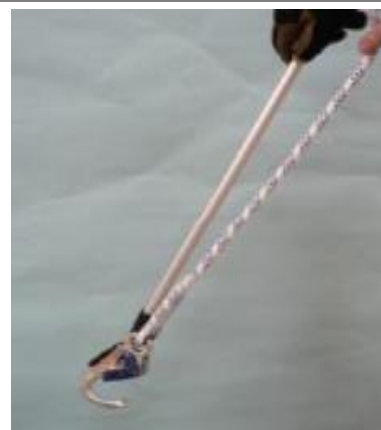
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### Emergency Fall Recovery Exercise

#### Key Components – IKAR Retractable Remote Rescue Pole (RRRP)

Our default method of rescuing an unconscious faller is to use the RRRP / Hook a Duck pole. This rather cunning device enables the rescuers to attach the retriever's hook to the unconscious faller – {usually to his rear D Link as his unconscious head tends to loll forward blocking off the front D Link} - from a position of safety. The pole is long enough to reach a faller who has experienced maximum harness impact absorber deployment, from his original anchor point.

The rescuer clips the retriever's hook into the restraining cup on the end of the pole, which holds it in the open position.



With a degree of patience, skill and practice, the hook is inserted into the harness D link and released from the pole with a simple twist of the wrist.

The hook locks to the D link and the unconscious faller can now be winched up to down to a place of safety.



So in summary, when the site rescue plan identifies the need for a retriever fall arrest block, you also need a GOTCHA Loop and a Recue pole – a 3 component **RESCUE K IT**.

We also have available some rather spiffing bags marked "Rescue Kit" available to keep the stuff in.

Fairly obviously you also need training in rescue techniques and SHEQ are ensuring the relevant training is being carried out on sites where use of a Retriever block is necessary, due to the nature of the structures being erected; EG cantilever, drop lift, beam work etc.



Video to be produced of an emergency fall recovery exercise on the M5 Oldbury Viaduct scheme in the 2<sup>nd</sup> Quarter 2018

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### Additional reference material

#### PowerPoint Presentation

- Appendix 04 - M5 Oldbury: Fall from height Reportable injury and follow-up

#### Example SHEQ Inspection Template (Lyndon Scaffolding)

- Appendix 05 - SHEQ Sample Report

#### Toolbox talks (Lyndon Scaffolding)

- Appendix 06 - TBT050-2016-01 IKAR HRA 15 Retriever Block
- Appendix 07 - TBT063-2017-01 Tool Tethers
- Appendix 08 - TBT064-2017-01 Securlpulley Use
- Appendix 09 - TBT078-2017-01 Safe Ladder Access
- Appendix 10 - TBT093-2017-01 Safety Harness Inspection

#### Videos

- Appendix 11 - Sample Induction video
- Appendix 12 - Sample behavioural video
- Appendix 13 – Not used
- Appendix 14 - Safety Step
- Appendix 15 - Safety harness use and inspection video
- Appendix 16 - NASC SG6 Manual handling video

#### Highways England

- Appendix 17 – Safety Alert HEi028 – Reportable Injury, Fall from height [Sep 17]
- Appendix 18 – Raising the bar 16, Working at height [Version 1, Sep 2013]

#### PowerPoint Presentation

- Appendix 19 – M5 Oldbury Viaduct scheme fall from height injury and follow-up