



SCAFFOLDING INNOVATIONS

ASSET INTEGRITY PARTNER

STORK

PROVEN SCAFFOLDING SOLUTIONS

WITH MORE THAN 30 YEARS EXPERIENCE, STORK IS THE UK'S LARGEST OFFSHORE SCAFFOLDING COMPANY. WE ARE AT THE FOREFRONT OF TECHNOLOGY DEVELOPMENT, CONTINUALLY INTRODUCING AWARD-WINNING NEW SYSTEMS AND INNOVATIONS TO INCREASE SAFETY AND EFFICIENCY WHILE CUTTING COSTS.

SAFETY INNOVATIONS AND IMPROVEMENTS

- High Tensile Scaffold Tube
- New Fittings c/w Flanged Nuts
- Inflatable Tunnel
- Composite scaffold fitting

- Ladder Access Hatch
- Wedge Type System Scaffold
- Pneumatic Impact Wrench

- Lightweight Steel Ladders, Pitch Guide & Inspection Label
- Podium Step
- Combined End Tube & Fitting Protector
- Scaffold Inspection Tag and Holder
- Inertia Reel Anchor
- Band & Plate
- Access Safety Gate
- Tethered Scaffold Tools
- 3D Scaffold Simulation



Research &
Development

Location Trials

Introduced

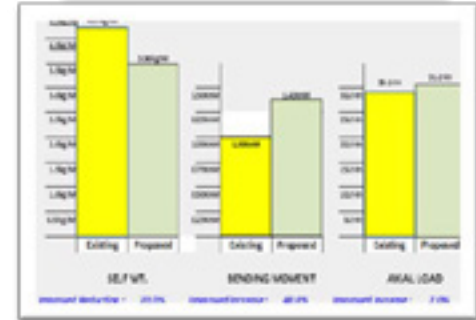
INNOVATION 1: High Tensile Scaffold Tube

Steel galvanised scaffold tube is normally 4mm wall thickness and has a self weight of 4.37 Kg/m.

High tensile steel galvanised scaffold tube is approx. 20% lighter with a 3.2mm wall thickness and self weight of 3.56 Kg/m.

The reduction in weight has obvious manual handling benefits, including a horizontal load increase of 40% and a vertical load increase of 7%.

Note: Both types of tube are compatible and can be used within a scaffold arrangement.



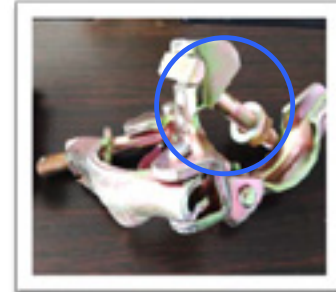
INNOVATION 2: Presco ‘T Bolt Type Load Bearing Coupler’

Existing pressed steel load bearing couplers have a “pinned” type bolt. This arrangement prevents removal and replacement of the bolt, rendering the coupler unserviceable if the bolt is damaged.

The proposed change to a “T-Bolt” type arrangement would allow for a cost effective bolt replacement and subsequently couplers would then be re-used.

Presco (fitting manufacturer) are presently conducting load tests, c/w flanged nuts as per EN39 to ensure the coupler meets the required loading criteria of 9.1kN for a class B coupler.

If successful, this type of coupler will be introduced accordingly.

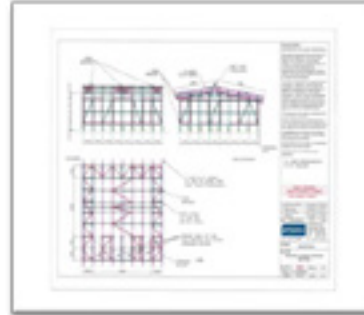


INNOVATION 3: Inflatable Tunnel

A habitat scaffold construction was requested for an offshore heli-deck refurbishment. Traditionally system scaffold, aluminium beam roofing and Kedar tracking would be used taking **4 days to erect and 2 days dismantle**.

To cover the deck area, 8 x erection/dismantling scenarios are required **32 days erection and 16 days dismantle** which is very time consuming.

Alternatively, an inflatable tunnel is being researched. This would allow construction in approx. 20 minutes. Using water ballast tubes on the main outer sides, movement would only be to disengage the ballast tubes, deflate, reposition, inflate and re-insert ballast. **Approx. 1 hour (c/w transparent PVC gable to allow max. lighting)** which is a vast reduction in man-hours and costs.



INNOVATION 4: Composite Scaffold Fitting

Due to the heavily laden salt environment offshore, conventional steel scaffold fittings can become severely corroded. This inevitably leads to increased risk of injury at the scaffold dismantle stage as well as an increased requirement for servicing.

Furthermore; it is recognised that galvanic corrosion is evident when steel scaffold fittings are used in conjunction with Aluminium products (particularly over longer periods).

Addressing the above, the use of a composite fitting is being investigated for loading, durability, servicing and dismantling suitability.



INNOVATION 5: Ladder Access Hatch

To assist with providing a safe working environment within a scaffold working platform the access safety hatch provides a manual hinged hatch which can be opened and closed to allow access to upper & lower levels.

Currently on trial at an offshore Stork location awaiting client feedback.



INNOVATION 6: Wedge Type Steel System

Recent successful trials were carried out at an onshore location using the Steel System Scaffold complete with 4 x buttresses & 2 x outer staircases.

Stork constructed the system scaffold to facilitate external fabric maintenance coatings to a large storage tank. Using system scaffold, a 60% reduction in access man hours was achieved compared to using conventional scaffold materials.

Manual handling was vastly reduced due to a reduction in the number of components required.

Feedback from Scaffolders and technical support was excellent. Further positive feedback has been received from an onshore terminal large system scaffold work scope.

CASE STUDY: ONSHORE TERMINAL

SCAFFOLDING WEDGE TYPE SYSTEM

Workscope

Stork was challenged to reduce access costs during a condensate storage tank level fabric maintenance campaign. This campaign required an innovative scaffolding solution to provide access to the entire exterior surface of a 4 x 4 m, 100-tonne fibre condensate storage tank for surface preparation and painting.

Solution

Stork successfully utilised a wedge type scaffolding system to erect a full tower scaffold to the exterior of the condensate tank to enable access for cleaning and spray paint application activities.

The system scaffold was erected by Stork's onsite Scaffolders, minimising the requirement for third party members.

Results & Benefits

The installation of the scaffolding system produced a number of key benefits:

- The system provided an approximate reduction of 60% in access hours to working areas and significantly reduced the requirement for manual handling.

Worksite solution resulted in a reduction in the scaffold storage required - 100m³ was reduced to 10m³ - and the utilisation of system components for 100 tonnes was reduced.

The wedge type system is fully compatible with conventional tube and fittings as its components share the same universal standards.

The contents components are colour coded, to speed the erection time process.

Project information:

- When:** July 2014
- Location:** Onshore terminal
- Installation:** System design provided a 60% reduction in labour hours
- Materials:** Wedge type scaffolding system
- Safety:** Project delivered with no lost time incidents



INNOVATION 7: Pneumatic Impact Wrench

To assist with the dismantle of long term scaffold seized fittings, a suitable pneumatic impact wrench has been demonstrated with location trials awaiting.

- Training will be required
- HAVS use requires to be recorded

Ref: Risk assessment 06.0-LD-002 Long term scaffold dismantle using pneumatic tools.



INNOVATION 8: Lightweight Galvanised Ladder, Pitch Guide & Ladder Inspection Label

Lightweight Galvanised Ladders

The steel ladder was introduced to replace timber ladders for the following reasons:

- The **only** scaffold ladder certified to the latest EN131 European Standard for ladder certification and classification. No deformation caused by weathering
- Flat rung surface at 1:4 angle which increases the foot contact area
- The surface on the rung is serrated to obtain a safer footing

Pitch Guide

- The adhesive Ladder Pitch Guide is attached to the outer face of the left hand stile at eye level
- The vertical blue line always sets the ladder at an angle of 4 vertical to 1 horizontal, providing a safer means of access
- All ladders purchased from our supplier, will have the pitch guide & inspection tag labels in position

Ladder Inspection Label

- Self-adhesive and permanent
- Positioned by the inner left hand rung at eye-level
- 11 x 6 month inspections means it is around five years before the label needs to be removed and replaced



INNOVATION 9: Podium Step

Due to the existing Low Level Delta Deck being prone to corrosion and seizing of joints, the Podium Step is an ideal alternative which has the following advantages:

- *Less corrosive components*
- *Easily assembled*
- *Castor wheels attached aiding manual handling*

Note: Offshore version available c/w 3 No guardrails



INNOVATION 10: Combined Tube & Thread Cap

The use of individual caps for the tube ends and the fittings has been used throughout the offshore industry. These have now been manufactured incorporating both protective elements into the same cap, including high visibility for safety reasons. In addition the caps reduce the possibility of objects being 'stored' inside the tube.



Actual Safety Hazard
As the Scaffolder removed the tube a 2ft metal bar fell onto the scaffold from inside the tube.

4.0M Potential drop



INNOVATION 11: Scaffold Inspection Holders

The previous scaffold inspection holders were prone to fatigue breakage and consequently the inserted tag, containing the inspection dates, could easily be lost resulting in a possible safety hazard situation.

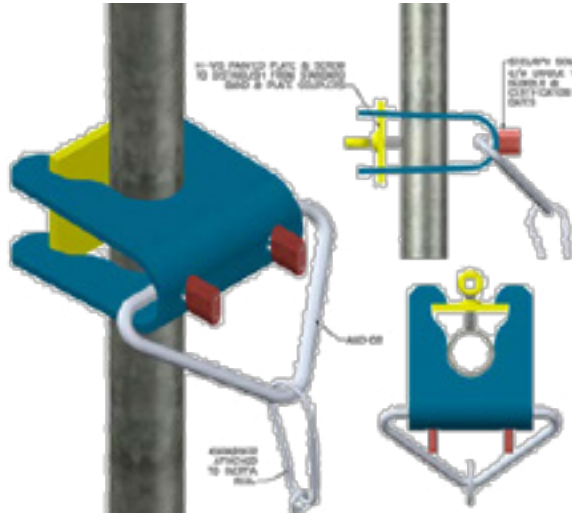
The introduced holders are pliable to withstand this fatigue with the following additional safety features:

- Only scaffold inspection signature & date exposed, upper details and lower warnings are protected within a transparent covering reducing any associated 'weathering'
- Interchangeable with existing holder
- The new holders have been introduced offshore with excellent feedback

Further improvements have been made by allowing for small slots at the bottom corners of the transparent covering to allow any potential water ingress to escape.



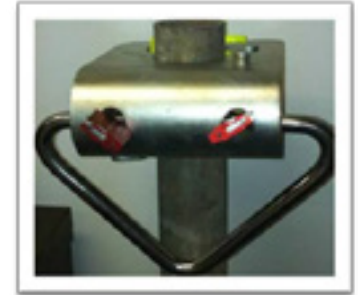
INNOVATION 12: Inertia Reel Anchor



Energy Institute Award 2012:
UK Oil & Gas Award 2013:
Offshore Achievements Award 2013:
REACH Safety Award 2013:

Finalist Safety Innovation
Finalist Safety Innovation
Finalist Safety Innovation
Winner Safety Innovation

The manufacturers of the Jordan Clamp & Wrappa has specified that it cannot be used to attach an Inertia Reel, which limits usage. The Fall Arrest Connector was manufactured and 3rd Party load test/certified to comply with the associated standards. Presently there are a number being trialled offshore with varying positive & negative comments.



The complete package (Band, Plate, Anchor & Security Seals) is certified as Fall Arrest Equipment EN 795 and inspected in accordance with EN365 on an annual basis.

The Anchor, will be attached by means of 2 x security seals and wire, these seals will have a unique number and certification dates.

INNOVATION 13: Band and Plate

The removal of fitting screw plates has caused considerable difficulty, particularly when it seizes into position. In addition when using this fitting, a scaffolder requires an additional 'podger' tool for removal.

Below you can see that bolt head has been altered to a corresponding bolt suitable for a 'traditional' spanner to be used. Furthermore, the existing heavy duty ratchet spanner can be used for removal when required. Also the above eliminates the requirement in carrying the 'podger' reducing the potential for 'drop-objects'.



INNOVATION 14: Safety Gate

Following positive feedback from several clients, Stork introduced a new design scaffold safety gate.

Benefits and improvements:

- Reduced height from 980mm to 680mm which covers the guardrail section of the access point
- Improved manual handling by removing mesh
- Reduced weight from 9.5Kg to circa 7Kg
- 3 course guardrail retained
- Double spring action retained
- Unnecessary integrated toe board removed
- Removed fitting fixing points allowing platform scaffold fittings to be used, reducing maintenance
- Symmetrical orientation retained, minimising maintenance
- Improved likelihood of installation within congested areas
- Single stop fitted
- Both Left Hand & Right Hand hinged



INNOVATION 15: Tethered Scaffold Tools

Working At Height Regulations:

“.....Every employer shall, where necessary to prevent injury to any person, take suitable and sufficient steps to prevent, so far as reasonably practicable, the fall of any material or object....”

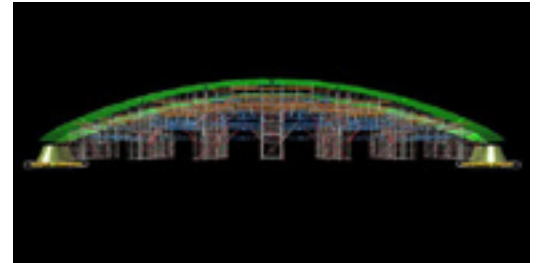
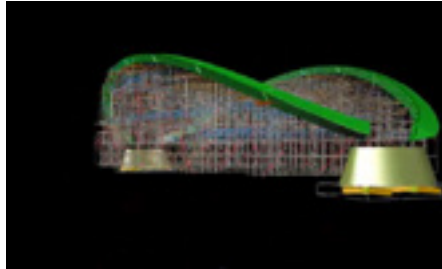
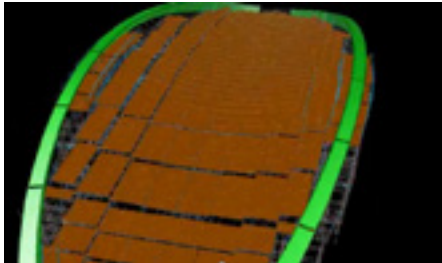
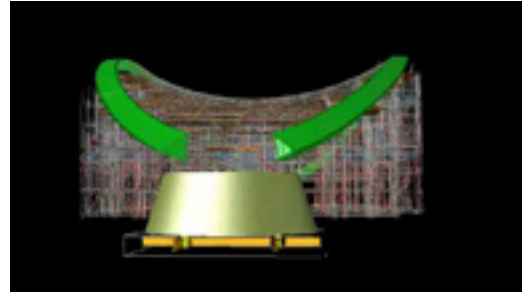
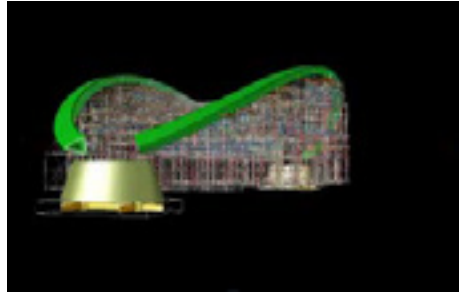
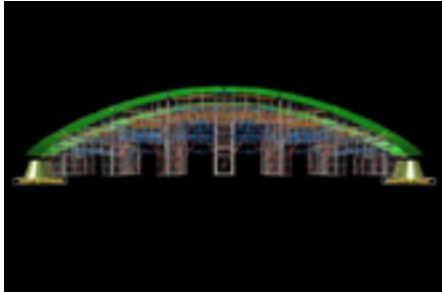
W@H regulation 2005

To comply with the above regulations and following consultations with our harness supplier and the Health & Safety Executive, Stork are now providing tethered scaffold tools including the spanner & spirit level (majority usage tools) at ALL locations.

Addressing the scaffolder's feedback and to ensure suitability in high salt laden environments, stainless steel spanners, improved grip and increased tether lengths have been incorporated and introduced.



INNOVATION 16: 3D Scaffold Simulation



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