



Plant Trial of EksoZeroG
At
M1 Smart Motorways J13 -16
From 25 March 2019
To 2 April 2019





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Executive Summary

The M1 J13 – 16 Smart Motorways Project trialled the EksoZeroG arm after it was demonstrated by Speedy Services and the Costain Plant Steering Group at the Group SHE Meeting in November 2019. The trial took place for a week in March and the equipment was trialled by operatives from a sub-contractor, Freyssinet.

The EksoZeroG is designed to help ease the physical burden on construction and electrical workers. With the exoskeleton technology, the EksoZeroG is designed so workers can complete heavy hand tool tasks with less fatigue which could lead to better workmanship, and fewer workplace injuries.

The idea of the trial was to see if the product could be practically used within the Smart Motorways environment and to get user feedback on the product.

The feedback from the operatives was overall positive with the following points;

- Operatives could instantly feel the benefits of having the weight of the tool removed
- It was easy to install and use.

Some weaknesses were identified such as;

- Restricted movement as the product needed to be fixed to handrail
- Difficulty in using the product as the operatives got further into the repair
- The product could only be used on one section of the pier due to the programme and the location of the scaffold at the time of the trial.

On the back of this feedback the following recommendations have been made;

- Increase the length of future trials to allow for more operations to trial the product.
- Manufacture to produce a more flexible way of securing the product so that workers are not restricted to being near handrails
- Speed Services to introduce the product to their hire fleet.



Report

Introduction

Gary Barnes, Costain Group Plant SHE Manager, and the Costain Plant Steering group had been liaising with Jodie Tracey from Speedy Services. During one of these meetings the EksoZeroG had been mentioned as a new innovation. Gary and Jodie arranged for David Brennan, Speedy Services Ekso Product Specialist, to demonstrate the EksoZeroG at the Costain Group SHE Meeting at Warwick University on 7 November 2018. Tom George saw the equipment demonstrated and showed Neil Grinham who thought that the product could be used for some of works within the Structures team, namely the breaking out of concrete for concrete repairs. Neil Grinham sent the product information to Freyssinet, the sub-contractor carrying out the concrete repairs on the existing structures. Freyssinet agreed to use the equipment for trial. Gary Barnes then arranged a demonstration of the equipment on site.

Jodie Tracey and David Brennan visited site on 12 March 2019 and demonstrated the equipment to Tom George, Neil Grinham and Rory Woolgrove, Freyssinet Senior Supervisor. It was agreed at this demonstration that the product would be trialled on site during breaking out works with a hand held breaker and the trial was arranged for 25 March 2019 for a week.

This is the first site to use this product in in a construction environment.

Aim of Trial, Terms of Reference

The trial was to see if the EksoZeroG could be used successfully within the Construction and Smart Motorways environment.

The trial duration was 1 week. The operatives who trialled the equipment were Freyssinet employees who are regularly using hand held breakers to break out for concrete repairs.

The key focus of the trial was to gain qualitative user feedback on the equipment and its application.

Involved Personnel

Jodie Tracey – Speedy Services – Account Manager

David Brennan – Speedy Services – Ekso Product Specialist

Gary Barnes – Costain – Group Plant SHE Manager

Tom George – Costain – Project SHE Manager

Neil Grinham – Costain – Structures Senior Agent

Rory Woolgrove – Freyssinet – Senior Site Supervisor

Sal Vella – Freyssinet – Site Supervisor

Ashley Gordon – Freyssinet – Operative



Louis Ward – Freyssinet – Operative

Location of Trial

The trial took place on the central piers of overbridge 227, Courteenhall East Lodge, south of J15 in the central reservation of the

The work being undertaken at the time of the trial was breaking out the existing concrete piers of overbridge 227 in preparation for concrete repairs. The tools being used to breakout the concrete was a Hilti TE60. Which is a hand-held breaker. The works took place on a low level access scaffold.

Equipment Details

The EksoZeroG uses exoskeleton technology to help ease the burden of regularly handling tools and equipment during construction work. The current design of the product is easily fitted onto existing scaffold handrails or the handrails of mobile elevated working platforms using a bespoke frame that is easily adjustable. The EksoZeroG uses harness straps to attach tools allowing for a variety of tools to be strapped to the equipment and different configurations for each tool.

Trial Data Obtained and Measured

No measurable data was taken during the course of this trial.

Operator Feedback

The general feedback from the operatives was positive with all three of the operatives who used the arm stating that it was clear that it took the weight of the tool and that the product was easy to install and use.

The negative comments were critical of the restrictions on movement with the arm attachments and as they were progressing further into the repair the arm struggled to reach certain areas of the repair. Feedback also suggested that the product could be more versatile if the arm came from overhead rather than from the side. It was also commented that more time to trial the equipment would have been useful.

Two of the three operatives would recommend the product to their company for certain operations or with some tweaks, such as having the ZeroG come from overhead and having the ability to extend the reach of the arm. The full feedback forms are attached in Appendix 1.

Photographs







Conclusions

In conclusion, the use of the EksoZeroG was overall positive. General operative feedback on the equipment was positive and they could instantly see the benefits in using the tool. No problems occurred during the trial.

The short duration of the trial however did not allow for the full benefits to be realised or for more applications of the equipment to be explored. The works were also nearing completion so the number of site locations for them to trial the equipment was limited.

Benefits

Takes weight of the tool – reduces strain on the operatives using the tool

Health benefits

Minimal training required and easy to use

Benefits to the workforce were instantly noticeable.

Works on a range of tools

Works with existing working platforms such as scaffolding and MEWP handrails.

Weaknesses

Restrictive as it had to be mounted to existing handrail

The operatives found it more difficult to use as they progressed with the work – further away from the scaffold handrails

Only available to purchase through and not on the Speedy Services Hire Fleet.

Recommendations

A longer trial would have been useful. Due to the nature of the programme and the ongoing works at the time there was only one day that the product could be used for. A longer trial would allow for additional, longer term benefits to be realised such as potential for increased productivity, fatigue reduction and flexibility to be used for a range of applications.

Speedy Services to put the product on the hire fleet.

Produce a more flexible approach to mounting the EksoZeroG other than scaffold and MEWP handrails as this limits the use to these areas only. There were additional piers that needed work but the location of the area to be broken out was too far from the scaffold for the EksoZeroG to reach.

It would be worth the manufactures investigating if using this tool the HAVS exposure is reduced. Currently this information is not available.



Appendices

Appendix 1 – Feedback from Freyssinet operatives

Sal Vella Freyssinet.

How easy was it to use?

easy to set up, easy to use

What were the benefits?

✓
took the weight out of the TEGO
~~TEGO~~ ~~TEGO~~

What are the limitations?

restricted with movement because of the arm. once set in position you're also limited to how low you can break.

Did you have any problems while using it?

no problems just not totally beneficial.

Would you recommend it to your company?

yes with tweaks.

Any additional comments?

maybe if it ^{arm} was over your head you could get more movement, like a pulley system.

Ashley Gordon

How easy was it to use?

6/10

What were the benefits?

Reduces Strain
fairly flexible movement

What are the limitations?

difficult to use deeper into repair
arm gets in the way

Did you have any problems while using it?

No just with the arm
getting in the way

Would you recommend it to your company?

NO

Any additional comments?

How easy was it to use?

6/10

What were the benefits?

Reduces Manual handling (strain on back)

What are the limitations?

Can be hard to manoeuvre

Did you have any problems while using it?

No was straight forward to use.

Would you recommend it to your company?

Certain jobs

Any additional comments?

possibly look at extending the reach of the arm.