



12TH CALL RECAP –  
From Manual to Digital Employee  
Handling

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On October 26th, the SWAN European Utility Alliance (EUA) held its 12<sup>th</sup> interactive teleconference with representatives from leading European water utilities. The call focused on “From Manual to Digital Employee Handling” and featured a presentation by Gary Smith, Head of Asset Information at Welsh Water.

As Head of Asset Information at Welsh Water, Gary Smith leads four professional teams delivering operational services with a focus on asset data management and data exploitation, Sharepoint, Azure, and the application of new and emerging technologies in a high-risk industrial context including augmented, mixed and virtual reality. This work is being used to support and improve health and safety in the industry. Gary is currently working with ISO on the development of international standards on the use of wearable technology in regards to risk reduction.

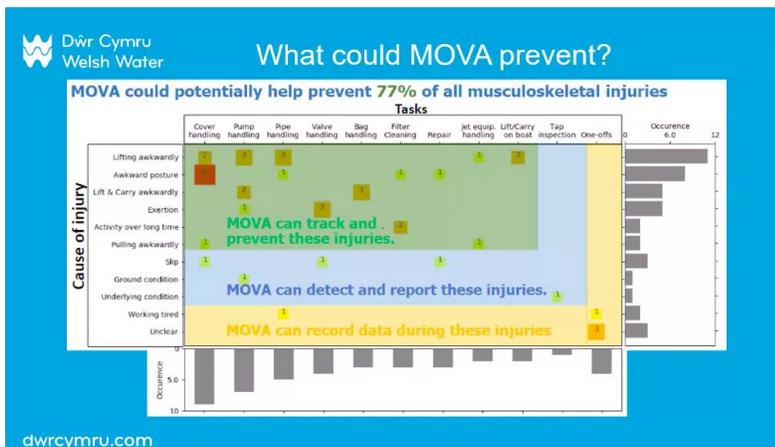
## I. MOVA - Smart Data and the Reduction of Manual Handling Injury

### What is MOVA?

MOVA is the smart way of capturing movement data, including pressure loads. The presentation focused on MOVA, and how it can be used to reduce and prevent manual handling injury. Manual handling generates forces on the user in three planes: up and down (transverse plane), left and right (sagittal plane), and forwards and backwards (frontal or coronal plane). MOVA uses X, Y, Z coordinates to measure loads during handling. This is done by installing non intrusive triaxial accelerometers and load sensors in the PPE.

Since implementing MOVA, Welsh Water has made great strides in the reduction of Manual Handling injuries. Welsh Water has implemented several control measures to manage manual handling risks, including the implementation of these programs: Manual Handling Procedures, Pristine Condition Manual Handling Training, and Refreshed Training Risk Assessment Corrective Action (TRACA) training. They have also identified 359 TRACA Coaches in order to carry out TRACA observations per month. From 2020-2021 TRACA coaches have carried out 3996 observations.

### What Could MOVA Prevent?



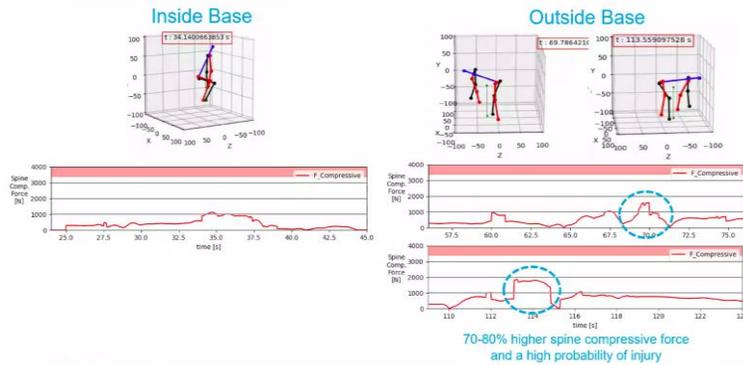
MOVA could potentially help prevent 77% of all musculoskeletal injuries, with the top risks identified as cover handling, pump handling, and pipe handling.

## II. MOVA in Practice - Case Studies

Gary presented three operational scenarios to demonstrate how MOVA and the use of avatars, load sensor graphs and back angle graphs can be used to improve manual handling practices.

### 1. Office - paper waste lift and carry (11kg)

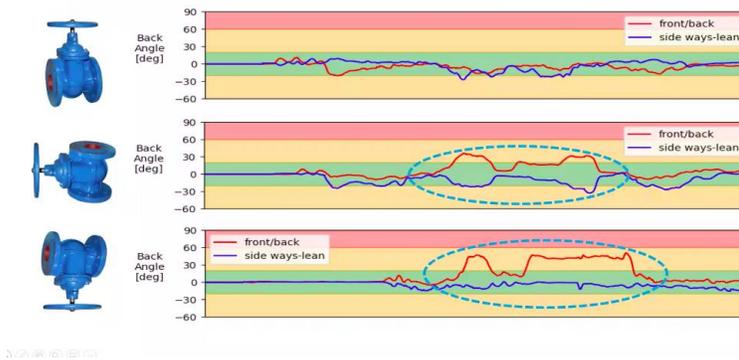
#### Good v Poor Technique



Collected data is used to help improve manual handling practices of targeted employees not displaying best practices.

### 2. Potable - Valve Handling and Movement (16kg)

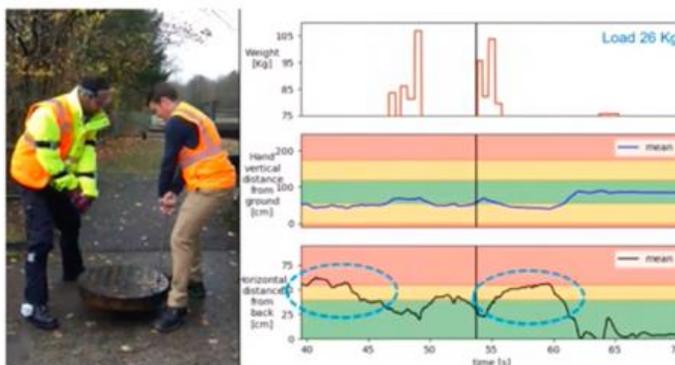
#### Valve handling – the impact of load orientation on spine angle



Valve orientation impacts load orientation on spine angle.

### 3. Waste - Access cover handling (26kg and breakout force)

#### Access cover – high hand to back distance



### III. Key Discussion Points

Following the presentations, participants were invited to ask questions and then an open discussion ensued on the benefits and disadvantages to adoption of new technologies.

- **Andy Smith (Anglian Water):** One of the main issues with wearable tech is GDPR (General Data Protection Regulation) and sensitive personal data. How have you overcome this hurdle of GDPR and handling sensitive personal data?  
A: It is a big hurdle and focus. In terms of GDPR, we are collecting anonymized data from individuals at work and sharing it with colleagues elsewhere, with the full consent of employees. In terms of other smarter programs, such as augmented reality, we still have a challenge when we are using wearable technology. We are accidentally capturing 3rd party presence in the background. That is a challenge for us. We don't store that data anywhere. We only use it in real time. If we were to start to record that data or do more work in terms of remote assistance, that will also prove to be a challenge.
- **Günter Müller-Czygan (Hof University):** Is the exact position of the person also recorded so that position tracking is possible via GBRs?  
A: Yes. A pre-monitoring calibration has to take place. There are set coordinates and calibrations for each movement. Each individual can be pinpointed at each exact moment in time. Theoretically, we believe we could almost build a Digital Twin Avatar which overlays in the environment to give it more context.
- **Andy Smith (Anglian Water):** Have you rolled this out to any of your repair teams to aid them in repairing bursts?  
A: No. We are trying to use the work we have done in terms of technology and initial research to reinvigorate our own man handling training. We are using the equipment to measure operational colleagues, both male and female, of all different sizes in order to account for variables in gender, height, weight, body type, etc. We're using this data to reinvigorate in house man handling training.
- **Günter Müller-Czygan (Hof University):** Is it possible to add further sensors, for example H2S Detection, when working in the canal?  
A: Presumably, we could add any sensor. The real problem here is the human behavior element. The operators get used to the sensors, equipment, and PPE and it modifies their behavior. When they know they are being monitored, they modify their behavior to match what they think is expected. With regards to using the equipment in high risk environments, up until now we have avoided using the equipment and sensors in areas of high risk, chlorine or H2S because it is not intrinsically safe. The same applies to our AR work. We have done digital twin scanning, 3D point clouds, and stitch map processes. We generally avoid high risk areas such as toxic gas stores and OSEC plants. It just adds another layer to the complexity of the risk assessment process.
- **Andreu Fargas (CAT):** How many different people have you measured?  
A: Have completed five different working groups, including a mix of male and female colleagues.

- **Andy Smith (Anglian Water):** Are there plans to roll out this technology across most of your workforce?  
A: The initial studies were done on areas where we knew there was already high incidence of injury based on data collected. If we were to see high incidence in another area, for example meter reading, then we would apply this program in that area as well. It is not expensive tech to use, making it easily adaptable to other areas.
- **Andy Smith (Anglian Water):** Have you done any work on using the sensors to measure hand vibration over at Welsh Water?  
A: Not recently. Some of our initial research did include the use of hand held vibration monitoring equipment. It has since been outsourced because of legal requirements in the UK.
- **Raf (De Watergroep) : What is the outcome for opening the cover/access cover handling?**  
A: In a perfect world all access covers would be built on flat grounds with easy access. Since that is not the case, the goal is to empower the individual operators to take a minute to perform a proper risk assessment in order to avoid potential injury when handling and opening access covers.
- **Andy Smith (Anglian Water): Have you tested in different weather scenarios?**  
A: No. The speed of operation would definitely be variable in poor weather situations. You are more likely to take a shortcut during inclement weather. The technology can be used in the rain.
- **Amir Cahn (SWAN Forum): Are there any other utilities using Augmented Reality or Virtual Reality?**  
A: A few others are. Welsh Water uses VR in terms of Digital Twin. We are able to visualise the asset virtually using the Digital Twin. We are also using the stitch map process, which is like Google Earth. AR is focused on supporting complex decision making in adverse environments. We have struggled to find industrial partners to work with.  
  
A: Nele Philips (De Watergroep): Yes, we have VR glasses for visits to our plants to explain the process more visually, but still do not have them in the operational environment.  
  
A: Andy Smith (Anglian Water): We have also done a bit with AR with regards to BIM which is heavily used in our construction and design phase, but not in the operational phase. That is the untapped part of it for us as well.  
  
A: Gary Smith (Welsh Water): VR glasses are quite obtrusive so difficult to use in operational environments.  
  
A: Nele Philips (De Watergroep): Yes, we use them either sitting or standing still. Also need strong data and wifi connection which is difficult to achieve in the plant. When using them on the street, it is also very important to have accurate GPS.

A: Gary Smith (Welsh Water): Yes, we have moved away from GPS to edgeless marker tracking, where we were able to identify fixed points on an asset to circumvent this issue.

- **Amir Cahn (SWAN Forum): What are the long-term goals of the project?**

A: I would like to see man handling injuries reduced. I would also like to see other people try the tech and see if it works. If you have any of the same issues, it would be great to see if the technology can be applied there as well.