

# Enhancing Safety in Green Jobs: The SOHS Project for effective safety training in waste management plants

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## INTRODUCTION

The rate of waste generation is greatly increasing and it represents a big issue all over the world (Kaza et al., 2018). For this reason, the **Municipal Solid Waste Management (MSWM)** industry is rapidly expanding and the combination of **"safe" and "green"** becomes increasingly challenging. Workers in this sector engage in tasks that promote resources sustainability and the preservation of the planet, but these activities are often **"Dirty, Dangerous and Demeaning"** (Gregson et al., 2016). The combined exposure to multiple hazards and waste materials in plants represents an emerging risk. **Occupational Safety and Health (OSH)** has a remarkable impact on the productivity, environmental and social responsibilities of companies. The evolution of safety training through the integration of digital technologies becomes essential to improve training effectiveness in accident prevention. **The SOHS (Sustainable Occupational Health and Safety) project** addresses these challenges through a **human-centered ergonomic approach** to develop a prototype of a **gamified safety training tool** for workers in **2 case study plants in Italy** dealing primarily with plastic and paper recycling.

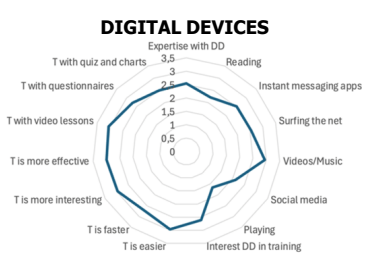
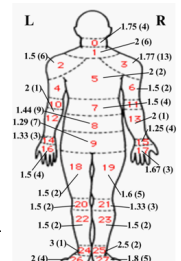
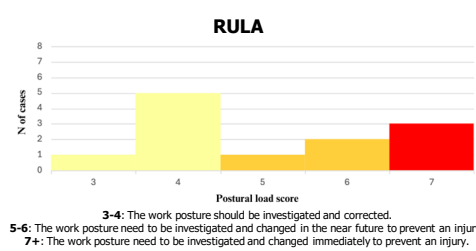
## METHODS

**Rapid Upper Limb Assessment RULA** (McAtamney & Corlett, 1993)  
Observation and postural assessment of upper limb loading of most significant tasks.  
**2 plants, 12 participants (Males=58,33%, M<sub>age</sub>=48,27, SD<sub>age</sub>=10,93)**

**Postural discomfort** (Corlett, 1995)  
Worker indicates in which of the 27 marked body areas he/she perceives discomfort at the end of the work shift, on a scale from "mild" to "unbearable".  
**2 plants, 31 participants (Males=54,84%, M<sub>age</sub>=44,24, SD<sub>age</sub>=10,47)**

**Ad-hoc "Work & Safety" and "Digital Devices" questionnaire**  
Self-reported questionnaire on safety climate and use of digital devices.  
**2 plants, 31 participants (Males=54,84%, M<sub>age</sub>=44,24, SD<sub>age</sub>=10,47)**

## RESULTS



Postural overload depends on workers' anthropometric differences: workers who were observed to have an upper limb load scored 5+ (based on RULA) were on average taller, reported discomfort in fewer areas of the body and perceived work as less dangerous, strenuous and repetitive compared to those who were observed to have a 5- score. Further, though workers perceived the company as caring about OSH and reported that they are compliant with the use of Personal Protective Equipment (PPE) and safety procedures, they also reported little consideration to safety aspects when planning their daily work and that they do not often discuss safety issues with colleagues. Workers said also they were familiar with digital devices and were willing to be trained through them, even if usually they do not play games.

## CONCLUSIONS

The first results of the SOHS project pointed out some discrepancies between observed and self-reported work conditions and behaviors, which will be accounted for in the development of the game scenarios for the prototyped training tool. The usability of the tool will be tested with workers to create a more engaging training experience.

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