

Varese, 29th April 2020

**Object: How the use of exoskeletons can reduce biomechanical load for workers? The ESO-EAWS project proposes some first results.**

On 28th April 2020, the ESO-EAWS scientific research project was concluded; it was born from the collaboration of the Fondazione Ergo with the Alma Mater Studiorum University of Bologna, the Laboratory for Engineering of Neuromuscular System (LISiN) of the Polytechnic of Turin and promoted by IUVO – spin-off company of the Sant'Anna School of Advanced Studies and part of the Comau group, global leader in robotics and industrial automation – with the aim of facing one of the greatest open challenges in the field of industrial exoskeletons: to understand and quantify **how the use of exoskeletal systems can effectively reduce the biomechanical load for workers, assisting them in their postures and movements.**

The results of the ESO-EAWS project finally allow **to relate the economic investment in wearable technologies to support manual work with the benefits in terms of reducing fatigue level of the operator** and, consequently, with the improvement of the quality of his work and the economic return for the company.

In fact, the use of an exoskeleton in a proper application field results in a perceived improvement by the less effort and less fatigue during working hours; moreover, in the companies that use the ERGO-MTM model, a biomechanical load reduction generates a reduction of the ergonomic allowance (which is the factor designed to increase the standard time of a manual task to cope with an increased fatigue level); in the long run results are also in lower incidence of musculoskeletal diseases. This last point, together with the decrease of the ergonomic allowance factor, is fundamental for the reduction of costs both for the company and for the health system.

The main focus of the study was **the impact on the biomechanical load calculation model of the EAWS system** (Ergonomic Assessment Work-Sheet - a tool for assessing the overall risk of biomechanical overload), **generated by the use of the passive exoskeleton MATE** (Muscular Aiding Tech Exoskeleton).

MATE, developed by IUVO and produced and marketed by Comau, is an advanced exoskeletal device which, thanks to a sophisticated mechanism with gears and passive elastic elements, is able to provide the operator with assistance to the upper limbs, reducing the workload where it is necessary to manipulate objects with the hands/elbow at/reaching the shoulder level for relevant durations (application examples: underbody assembly in the automotive sector, cleaning of windows with telescopic rod, hooking panels on overhead painting rail).

The research project, started in May 2019, can be defined as pioneering because it addresses one of the main barriers to the massive diffusion of exoskeletons in the industrial sector.

*"We are pleased to have activated a project based on **requests from companies and unions** and which has developed with a high-level, strategic partnership that, thanks to the coordination of Prof. Francesco Violante, has guaranteed not only the scientific nature of the project , but also allowed us to develop a unique and focused **EAWS system certification procedure for industrial exoskeletons**"* reports Gabriele Caragnano, Technical Director of Fondazione Ergo *"The expertise provided by LISiN, leaded by Prof. Marco Gazzoni, has also allowed to develop a protocol to assess the effect of the exoskeleton combining muscle activity and movement analysis "*.

*"The ESO-EAWS project sets an important milestone in the field of bioengineering and wearable technologies: this is the first method that allows to quantify the positive impact of using exoskeletal systems on the biomechanics of operators"* highlights Dr. Simona Crea, Scientific Advisor, co-founder of IUVO and Researcher of Sant'Anna School of Advanced Studies.

The project ended with the production of an "Addendum" to the EAWS user manual entitled "Appendix: Exoskeletons impacts on EAWS evaluation", which has been globally released in April 2020.

Some meetings and events are scheduled to describe the content of the study and the results achieved.

*For any further information*

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