

ISOES Newsletter

Inside this issue:

Letter from the Past President	2
ISOES Booth at ASSP 2021 Conference, Austin, TX	3
Railroad Handbrake Operation—Improving Human Capabilities	3
XXXIIIrd (2021) Annual ISOES Conference Summary	4
ISOES Conference Student Award Recipient	4

Letter from the President



Steve Fleming, BSE, MBA, CPE, CXLT

ISOES President 2021-2022

What an honor it is to serve as the President of ISOES, as the society embarks on its 36th year of striving to fulfill its mission: “To promote through research, education and sound professional practice of ergonomics and safety, the creation of safer, healthier and more productive working environments around the world.” A special thanks goes to Dr. Clarence Rodrigues for making 2020-2021 a huge success, due in large part to his generosity of time and talent as President of ISOES. In my former roles as Secretary and as Member at Large, I have also been fortunate to work with and to get to know the other amazing professionals who serve on the Executive Committee. With sincere gratitude, I would like to recognize Dr. Chao Wang

and Dr. Shuping Xiong for their outstanding contribution to the Executive Committee during their respective terms. During this transition period, I would also like to welcome PhD Candidates George Page (Member at Large) and Udemba Chiemezie Anthony (International Member at Large) to the Executive Committee. I could not be more confident that this team of fellow practitioners and researchers will succeed in making this a great year as we work to add value to your ISOES membership.

Before the close of 2021 we will finalize this year’s conference proceedings, complete with Digital Object Identifiers (DOI) for each finalized paper. We are also very much looking forward to hosting the 34th annual ISOES conference in 2022. Stay tuned for conference details and for the call for abstracts – we hope you will participate! We are pleased to continue the practice of offering “excellence awards” for outstanding professional (non-student) and student papers. Another exciting

initiative is the launch of our [Research Grants and Outreach Award programs](#). Past president Dr. Gabriel Ibarra-Mejia was instrumental to the formation and launch of these programs and, beginning in 2022, we intend for them to serve as yet another means for ISOES to promote great work in the realms of ergonomics and safety. Our society is healthy, vibrant, and poised to continue its influential presence in ergonomics and safety at the international level.

I am appealing to all members to continue your support of the ISOES and its many noble missions. Please give some serious thought to reaching out to a colleague and encouraging them to support these missions by considering an ISOES membership of their own. Thank you for your contribution to the ISOES and I am looking forward to all that lies ahead!

“Another exciting initiative is the launch of our Research Grants and Outreach Award programs. Past president Dr. Gabriel Ibarra-Mejia was instrumental to the formation and launch of these programs...”

Keep up-to-date on ISOES:

- Check the ISOES website: <http://www.isoes.info>
- Sign up for the ISOES mailing list [here](#)
- Follow us on social media:



Letter from the Past President



Clarence C. Rodrigues, PhD, PE, CSP, CPE
ISOES President 2020-2021

Greetings to all of you in the ISOES community. I hope you are staying safe and continuing to protect yourselves from the health threats of our times. It is with mixed emotions that I pen this final brief in my capacity as past president and member of the Executive Committee (EC). I would like to express my thanks and gratitude to the members of the EC for helping to make my term as President a very productive and enjoyable experience. The comradery and professionalism I experienced was beyond compare - thanks Gabe, Steve, Marc, Richard, Priya, Jaajin, Shuping, Chao, Anand and Jim.

We had our share of successes, and I would like to begin with our annual conference in September that was a great success by any measure. Our decision to go completely virtual very early on and waive the registration fee

proved to be wise as we had one of the best attendances in recent years. Many thanks to Steve and his organization, Page Engineering, Inc., for hosting and anchoring the conference. Also, a note of appreciation is due to Chao, for setting up the abstract and paper coordination on EasyChair and to Marc, Steve, and Jim for managing the final paper production for the conference proceedings, with Jim being the final proceedings editor. The conference Zoom link was accessed 179 times and there was a total of 23 presentations with accompanying papers. In addition, a DOI number was established for the very first time for the conference proceedings – thanks to Anand for this effort. This year we updated our paper awards to include a non-student and student category. Lastly, the conference was graced by a very high-profile keynote speaker: Dr. Waldemar Karwowski, Pegasus Professor and Chairman, Department of Industrial Engineering and Management Systems University of Central Florida.

Another achievement was the [Outreach Grant Initiative](#). The primary function of this initiative is to provide limited support to academics, practitioners, students, and other professionals for their outreach service endeavors related to ergonomics, human factors, and safety. The goal is to provide funding for projects that incorporate evidence-based practice and support initiatives that are congruent with ISOES's purpose and mission. I encourage you to apply for these grants. Many thanks to Gabe for pioneering this effort. The speaker gifts' new design (pens with ISOES logos) and vendor selection for the order/delivery was another successful undertaking and thanks to Steve for

playing a key role in this initiative. Fifteen (15) EC meetings were conducted through the year, with Richard doing a great job handling the meeting minutes. On the advertising front, Jim secured a booth for our society at the annual ASSP 2021 Conference, with the display, props and staffing managed by Gabe and student volunteers from Texas State Technical College. Lastly, a vote of thanks goes out to our web master and newsletter editor, Marc; treasurer, Anand; international member-at-large, Shuping; member-at-large, Chao, and our newcomer member-at-large, Priya for their contributions in their respective roles.

In conclusion, while we work together to build on our accomplishments of the past, I reach out to you our members to get involved and contribute to the efforts of the ISOES which has a vision to be the world's leading forum for the exchange of ideas between practitioners and researchers in the design and analysis of safe human work systems, and a mission to promote through research, education and sound professional practice of ergonomics and safety, the creation of safer, healthier and more productive working environments around the world.

"I would like to express my thanks and gratitude to the members of the EC for helping to make my term as President a very productive and enjoyable experience."

REMINDER: Please remember to contribute ISOES membership dues.

⇒ Check <http://www.iso.es/info/membership.html> for further details.

⇒ *Your membership dues help support ISOES and all our activities* such as our conference, (upcoming) grant program, website maintenance, and much more!

ISOES Booth at ASSP 2021 Conference, Austin, TX

By Gabriel Ibarra-Mejia & Jim Borchardt



For the 4th time in the past six years, the mission of ISOES has been promoted to Safety, Health and Ergonomics (SH&E) practitioners, academics and students at the 2021 ASSP PDC Exposition in Austin, TX. Nearly 600 conference attendees stopped by our booth #427 during the 3 day Expo. Thanks to the students & faculty members from Texas State Technical College who volunteered to their time to make

our booth a success. Thanks also to Grainger Industrial Supply and Quad City Safety Products for providing a wide range of “handouts” which were swooped up quickly by Expo attendees. ISOES has plans for another ISOES Booth at the ASSP 2022 Conference and Exposition June 27 – 20, 2022 at McCormick Place in Chicago, IL. Booth volunteers enjoy having access to both the hundreds Conference Exhibitors and presentations so contact Steve Fleming, ISOES President if you are interested in being an ISOES Booth Volunteer.

Railroad Handbrake Operation—Improving Human Capabilities Through Improved Methods

By George B. Page, MSE, CPE

ISOES Member-at-Large

Even with much modernization, the railroad industry still has many tasks that are performed with manual effort. Among the tasks performed by railroad employees that work in train yards, sidings, and loading docks is setting and releasing freight car hand brakes. And one of the common types of hand brakes is the ratchet-style hand brake. It is operated while the individual stands on the ground. The lever handle on the ratchet-style hand brake operates up and down in about a 12-inch stroke. One tightens the hand brake by taking up the slack with a half-dozen strokes, which encounters little resistance. Then, as the slack is taken up, the final stroke(s) of the hand brake lever encounters about 60 pounds of resistance or force.

The question has arisen: can we improve employee performance capability through the methods or techniques that he or she deploys to set the hand brake, especially for the final stroke that requires about 60 pounds of force applied in an upward direction?

For the purpose of our study, we focus on female strength capability—enhancing their capabilities in the field expands the pool of women that can do the essential functions of the job, this task being among the essential functions.

We used the biomechanical model from the University of Michigan, the Three-Dimensional Static Strength Prediction Program™ (3DSSPP), to demonstrate how employee technique can improve employee

performance.

Figure 1 shows a view of the task of operating a ratchet-style hand brake from the ground (with a female humanoid of 50th percentile anthropometry) using only the right hand on the brake lever. This is the current, common method or technique used to set the hand brake. The figure also shows that the elbow and shoulder strength capabilities are 50% and 52%, respectively. This indicates that a large portion of the female working population would not have sufficient strength to perform this task.

With this result in mind, we focused on a new method or technique by which to set this type of hand brake. This method focusses on reducing the load moments about the elbows and shoulders and shifting the load to the legs. Moreover, the new method utilizes two hands, rather than one. The technique or method has the employee approach the lever handle with arms straight above their heads, adjusting

the height of the hands to match the height of the hand brake lever by flexing their knees.

The results are shown in Figure 2. By keeping the elbows straight and focusing the force exerted by the hands (force vectors) through the elbow and shoulder joints, we reduce the loading upon the elbows and shoulders, hence, increasing elbow and shoulder strength capabilities dramatically. In this case, the elbow and shoulder strength capabilities, as calculated by the 3DSSPP™ increased to 100% and 81%, respectively.

Some railroad industry tasks still require significant human effort to perform. However, the method or technique by which such tasks are performed can significantly affect overall human performance. In this example, we were able to increase upper-body strength capabilities with relatively minor adjustments to the method by which the task is performed. By doing so, we broaden the pool of employees that can perform this essential railroad task.

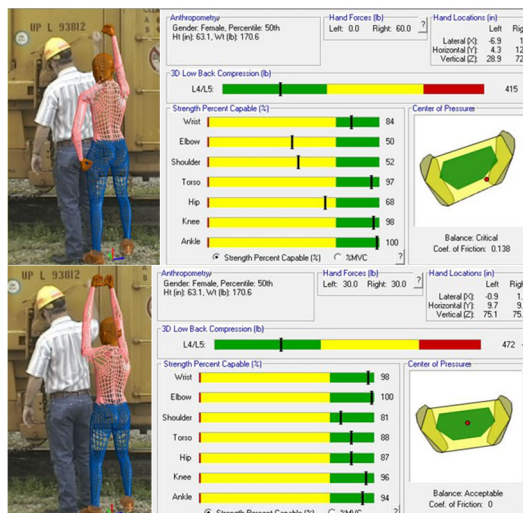


Figure 1. Photo of task, the biomechanical model's humanoid representation of the task, and the calculated strength capabilities using the traditional method/posture.

Figure 2. Photo of task, the biomechanical model's humanoid representation of the task, and the calculated strength capabilities using the new method/posture.

XXXIIIrd Annual ISOES Conference Summary

By Marc Snell, PhD, Eur.-Erg.

ISOES Webmaster and President Elect

From September 16-17th 2021, the International Society for Occupational Ergonomics and Safety held its 33rd annual conference. Each year ISOES organizes an international conference, giving global professionals from various industries and academic settings to present their work and research. In the wake of Covid-19, ISOES held its second ever online-only conference. Uniquely, in 2021, ISOES offered a completely free attendance for all attendees.

A total of 23 papers were presented in

2021, over a period of 6 sessions covering the topics of Vibration and Occupational hazards, Biomechanical Assessment and Postural Analysis, New Methods/Technologies for Risk Assessment & Accident Prevention, Ergonomic Risks Exoskeletons and Others, Occupational Health and Safety: Case Studies, and Safety/Assistive Product and Evaluation.

ISOES was honored to welcome Dr. Waldemar Karwowski as the keynote speaker in 2021. Dr. Waldemar Karwowski is the Pegasus Professor and Chairman in the Department of Industrial Engineering and Management Systems at the University of Central Florida. The keynote address was titled “Human and Artificial Intelligence and

Safety at Work” and discussed a new approach to humanity-centered AI, known as Cyber-ergonomics.

ISOES was pleased to announce the recipient of the 2021 student paper award to be Chellappa Vigneshkumar, whose paper was titled “Designing a Safety Knowledge Management Prototype to Assess and Review Fall-Related Safety Risks for Indian Construction Companies”. Further, ISOES would like to thank the hard work of the 2020-2021 Executive Committee for all their work in organizing the conference, and the ongoing effort ensuring the double-blind peer review for all papers presented.

ISOES Conference Student Award Recipient



C.Vigneshkumar, Ph.D. Research Scholar

Department of Design, Indian Institute of Technology Guwahati

I am currently a Ph.D. research scholar in the Department of Design, Indian Institute of Technology Guwahati (IIT-G), India. My proclivity towards construction safety was actuated during my postgraduate years through exposure to introductory textbooks in construction project management, construction safety management, and a subsequent project on construc-

tion safety management systems for Madurai city, India. With further extensive readings on design for safety, ergonomics, and human behavior, I was motivated to join the Ph.D. program in Design at IIT-G. I started collaborating with Dr. Urmi Ravindra Salve at IIT-G to develop a framework to integrate prevention through design concepts with construction design processes to prevent accidents. Continuing my collaboration with Dr. Urmi Ravindra Salve, I conducted experiments with construction labors to understand the discomfort they face while wearing a safety helmet at the workplace. I enjoyed the process of re-designing safety helmets based on different criteria, and I designed a prototype of the helmet.

I have developed my research inclination towards interaction between design and safety through several research projects ranging from construction safety to design intervention. My research trajectories are to create a knowledge-based system to facilitate the risk assessment process to prevent falls in construction projects. My submission at ISOES 2021 conference was about a web-based tool “SAFEFORM” that I designed for the construction

safety heads who conduct a risk assessment in construction projects. SAFEFORM tool will help them to assess the fall risk level at any construction site focusing on formwork activities which further enables them to prepare in advance and take necessary fall preventive measures.

I am so grateful that my research idea and my work have been selected for the best student award and I am extremely thankful to the panel members for giving me this opportunity. This award will not only instil confidence within me but will also promote the use of SAFEFORM. I envisage bringing the armchair theories related to my domain into practice and this was the leading motivation behind the design of “SAFEFORM”. I will always propagate the implication of safety practices in construction industries to ensure a healthy and risk-free environment. This award will further open more space for discussion and help me in forging brighter connections and developing new synergies in my domain of research globally. Lastly, I would like to thank Dr. Urmi Ravindra Salve for her guidance on this research.