2021–2022 GRANT RECIPIENT REPORT

Ibukun G. Awolusi University of Texas at San Antonio

DON B. DAILY SAFETY GRANT

The effective management of major hazards in any high-risk work environment requires proactive and active risk management strategies. The objectives for this project were to: review the potential applications of Internet of Things (IoT)-based wearable safety devices (WSDs) for safety and health monitoring in steel manufacturing plants; characterize the safety and health hazards associated with the steel manufacturing plants; evaluate available IoT-based WSDs used for safety and health monitoring in steel manufacturing plants; and propose a conceptual framework for implementing IoT-based WSDs for worker safety and health management in the steel manufacturing industry.

Four students at the University of Texas at San Antonio participated in this research project. These students worked with Awolusi to conduct the research study. These students were involved in all the activities carried out in the project. The students reviewed multiple reports and publications on the steel manufacturing process, studied/watched AIST's interactive The Making, Shaping and Treating of Steel® Wheel, watched several videos of the steelmaking process, and culminated the activities with a tour of a steel mill in Texas. The tour of the steel mill gave the students firsthand and real-life knowledge about the steelmaking process and safety management in a steel plant, and the opportunity to interact with employees in a steel manufacturing plant.

The students will be playing a crucial role in disseminating the findings of the research. At least two seminars will be hosted at the University of Texas at San Antonio to discuss the results of the project with students in various disciplines at the university.

As part of this project, the research team consisting of the principal investigator and students had a tour of the steel mill to acquire firsthand knowledge about the entire steel manufacturing process, learn about the hazards workers encounter in steel manufacturing plants, and safety management procedures/measures adopted to protect workers. The plant tour conducted as part of the project, being the second tour organized through the partnership of Awolusi with the steel plant, has further reinforced their relationship and created avenues and opportunities for the continuous exposure of students from the University of Texas at San Antonio to the steel manufacturing process. Further steel plant tours will be conducted either as part of future research projects or class field trips for experiential learning. ✦

Did You Know?

thyssenkrupp Partners With bp on Decarbonization

bp and thyssenkrupp Steel announced yesterday they have signed a memorandum of understanding (MoU) for the long-term supply of hydrogen and renewable power in steel production. According to bp, the companies will explore options for blue and green hydrogen, as well as wind and solar power via power purchase agreements. The company is pursuing green hydrogen production at its refineries in Germany, the Netherlands and Spain, and is developing both blue and green hydrogen production projects around the world.

"As part of our strategy to provide a range of decarbonization solutions to corporates, bp is already investing in and working to develop a portfolio of industrial-scale hydrogen projects in Germany, the Netherlands, Spain, the UK and Australia," said William Lin, bp's executive vice president regions, cities and solutions. "With our aligned ambitions and complementary investments, thyssenkrupp Steel and bp can together help this hard-to-abate sector decarbonize faster."

thyssenkrupp Steel intends to make steel production climate-neutral by replacing its coal-fired blast furnaces with direct reduction plants that reduce iron ore with low-carbon hydrogen. Arnd Köfler, thyssenkrupp Steel's chief technology officer, said: "The decarbonization of the steel industry will require enormous quantities of low-carbon and in the long-term green hydrogen. This will increasingly require the use of electricity from renewable sources. All this can only be achieved through a well-developed hydrogen infrastructure with a supra-regional pipeline network. The MoU is an important milestone for us to set the course with bp for a reliable supply of energy in the future."