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Meidensha Corporation

To members of the media

Meiden develops VR-based hands-on safety education/evaluation system

System is designed to gauge participants' level of hazard recognition after virtually experiencing human error-triggered industrial accidents

Meidensha Corporation (Meiden) and subsidiary firm Meiden System Solutions Corporation have developed a VR-based hands-on safety education/evaluation system with Infocom Corporation to raise the safety awareness of manufacturing workers and prevent industrial accidents.

Design registration and a patent for the system, tentatively called the “VR Hands-on Safety Education/Evaluation System,” is currently pending. Infocom is an IT service company located in Minato-ku, Tokyo, and Meiden System Solutions is headquartered in the city of Numazu in Shizuoka Prefecture.



<Meiden Group's industrial safety education>

Since 2008, the Meiden Group has promoted hands-on safety education to enhance employee awareness of potential hazards. From 2016, the education service expanded beyond the Group, providing fee-based education to workers at other companies' factories and construction sites. Besides classroom lectures, the educational framework enables participants to virtually experience industrial accidents by using virtual reality technology that can yield high educational effects.

<Background for development>

The number of industrial accidents at factories, construction sites, etc., is declining due

to stricter safety measures taken by many corporations. Nonetheless, industrial accidents triggered by human error have not been entirely eliminated. It is therefore urgent to further enhance individual workers' awareness of potential hazards. The hands-on safety education service using an advanced VR system that Meiden has promoted so far includes a function whereby what participants have learned through the educational content can be reviewed. But evaluating its educational effects on participants without bias and quantitatively—or without leaving their judgment subject to the experience and opinion of a lecturer—has emerged as an issue that must be tackled. To solve this, Meiden has developed a system enabling the analysis and evaluation of individual workers' awareness of potential hazards, while recreating industrial accidents caused by human errors as virtual content.

<System outline>

The VR Hands-on Industrial Safety Education/Evaluation System (tentative name) focuses on 12 categories of human error and recreates human industrial accidents stemming from human error in eight of the categories in the form of VR content. Only a head-mounted display for showing the installed VR content and a controller are needed for the educational program. That means participants can learn about industrial accidents from any location. Increasing the number of the devices allows multiple participants to learn at the same time.

After the participants experience industrial accidents recreated in virtual reality, they take a test to gauge their level of hazard perceptions and confirm their level of understanding about hazards they actually face. Moreover, the results of the test (sections they answered correctly or wrongly, scores, pass/fail, rankings and time required for them to answer questions) will be sent to a cloud service where the data can be collected, aggregated and analyzed. Besides the participants, their superiors can also view the content of their virtual experience and the test results. This enables their superiors to check the results and provide instructions to workers in areas where they tend to make mistakes. This framework ensures continued learning for program participants beyond their onsite experience.

Meiden, Meiden System Solutions and Infocom have already started developing VR content for the remaining four categories of human error for scheduled completion within fiscal 2023. Meiden plans to use this system for in-house safety education starting from fiscal 2024 and make further improvements to the system with an eye to marketing the

system to other companies.

Categories of human error featured in the hands-on program

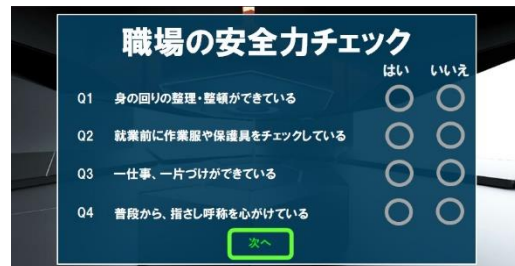
- Downplaying the hazard
- Panicking
- Lack of communication
- Carelessness
- Act of omission
- Misperception
- Defective workplace atmosphere
- Fatigue

Main flow of educational program

1. Input the participants' information



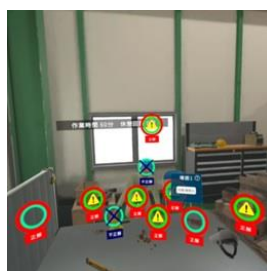
2. Check the safety level of workplace



3. VR experience



4. Hazard recognition test



5. Grading and explanations on answers



6. Confirmation of safety rules



The Meiden Group is committed to creating safe working environments as a company supporting social infrastructure and promoting safety education to eliminate industrial accidents.

Note: VR hands-on safety education is designed so that participants can experience industrial accidents in a safe manner by using virtual reality. The system enables participants to learn hazard sensations by bodily experience, thus enhancing their sensitivity toward hazards.