



VIRTUAL WELDING – A NEW DIMENSION IN TRAINING

Worldwide, the need of welders is ever going up. In the United States for example, the demand for Welders is projected to be one of the highest number of added jobs per year in many areas of the country. The trend is perhaps similar in many countries across the globe and India is no exception. At the same time, we face the reality factors like aging workforce, lack of adequate welding training programmes in vocational schools and growing disinterest in welding occupation by current tech-savvy generation. Simultaneously, the increasing performance requirements for manufactured systems calls for upgrading welders' skills for structural fabrication and for building critical and high-value components.

Virtual welding training has the potential to provide a possible answer to all these problems.

The concept of virtual reality has been around a long time and was originally developed as a gaming platform. NASA adopted the concept as the Flight Simulators came into being and the US department of defence also applied the concept. Since then, virtual reality has been widely used in developing virtual prototypes in all types of design situations. Price reductions in hardware and new software tools have pushed this type of simulation to many new applications.

The goal of a virtual welder trainer is to recreate the welding experience virtually including real welding gun for input, measuring movements, simulating the welding physics and creating a realistic visual / sound feedback.

Unlike classroom or computer-based training, virtual reality creates a hands-on experience that augments visualization with muscle memory and kinetic awareness, thus providing improved workmanship and productivity. Faster learning is possible as trainees can complete more practice welds within a fixed amount of training time and total training time can be significantly brought down. Further, instant feedback from each weld pass allows the trainee to improve upon the specific skills that need improvement, until the full technique of depositing a quality weld is achieved. Trainees can learn new techniques or practice their skills in a safe environment without risk of injury. Students can receive more hands-on practice welding without consuming expensive materials and the cost of waste disposal is eliminated. A virtual environment can be set for complex and critical welds involving expensive components. Also harmful emissions and/or waste materials are eliminated in a virtual environment.

Today, several companies offer technologies that help beginning welders get that hand motion just right. None claims that the technology will replace the real thing, of course, but they do say that training in the virtual world can give students a significant leg up by the time they weld for the first time. It helps teach students what really happens between the welding arc and workpiece, why certain hand motions produce good beads while other motions don't. And it also may help introduce welding to students who wouldn't have given the trade a second thought!

A handwritten signature in black ink that reads "P. K. Das". The signature is written in a cursive style with a large initial 'P'.

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