Designing Ergonomic Pipeline Welding Support Tool by Using Quality Function Deployment  
(Case Study: PT Alstom *Power Energy System* Indonesia)

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**ABSTRACT**

PT. Alstom *Power Energy System* Indonesia (PT. Alstom) is a manufacturing make to order company that produces boiler as their main product. Beside boiler, PT Alstom also supply design and pipe fabricated. During welding, supporting machine is used, namely pipe support holds the object being welded (pipes) for easier welding process. However, the existing pipe support at fabricated work station has not considering human aspect and also has limitation in its design. This research focused in the existing welding process that neglected ergonomic work principles therefore creating uncomfortable, unsafe and unhealthy working environment. Such conditions can be found at worker’s posture during welding process.

Using the considered existing condition, this research will develop alternative solution through redesigning pipe support that is capable to create comfortable, safe and healthy work environment to the workers. Development for this product using structured product development method, Quality Function Deployment (QFD). Evaluation and ergonomic consideration in pipe support design is shown in data application of anthropometry and biomechanics and can be seen form significant decrease of law movement. This shows at overhead position, where force 66.9 LbF before ergonomic intervention. While after ergonomic
intervention, there have been force value decrease to 54,4 LbF. Not too much different, at vertical position before ergonomic intervention force value at 55,1 LbF, after ergonomic intervention value change into 53,4 LbF. Afterwards, using Nordic Body Map application, can be calculated that there have been a decreasingly pain complaint at 13 body spot. This ergonomic pipe support design costs Rp 7.142.391,00. But it is expected to give company Rp 279.275.110,00 each year saving.

Key Words : Pipe Support, Ergonomy, Quality Function Deployment