



Equal strength connection of high strength steel thick section with low matching welding material by narrow gap hybrid laser - arc welding

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Abstract:

Narrow gap hybrid laser - arc welding is emerging joining technology that is very promising for the fabrication of thick sections in shipbuilding applications, but the matching performance of welded joint and base material has been seldom studied. This paper investigates the microstructure, microhardness and mechanical property of welded joints for 785 MPa high strength steel with 60 mm thickness with different welding materials. The results indicate that when the traditional welding material is used, the weld metal(WM) mainly contains lath martensite, its ultimate tensile strength and microhardness is 22% and 40% higher than those of base metal, respectively. While the low matching welding material is used, the microstructure of WM is predominately acicular ferrite and granular bainite, its ultimate tensile strength and microhardness is slightly higher than those of base metal, respectively. The impact energies under different welding materials are in the range of 88 to 96 J. The results indicating that equal strength matching is obtained with low matching welding material.

Biography:

Yanming Wu is a PhD student in School of Mechanical Engineering at Tsinghua University. He is also an employ-



ee of Luoyang Ship Material Research Institute. His main research direction is narrow gap hybrid laser welding of high strength steel. He has published more than 10 papers.

Recent Publications:

- Bergman, D. (2014). Sustainable Design Essentials Guide(X. Xu & R. Chen, Trans.). Jiangsu Science and Technology Press.
- Deng, Y. (2013). Study on the skin texture transformation of old industrial buildings in Shanghai—Taking the old industrial buildings along the Yangshupu Road in the North Bund as an example(Unpublished master's thesis). Donghua University.

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