

ABSTRAK

PENGARUH SUHU *PREHEATING* PADA HASIL PENGELASAN SMAW TERHADAP SIFAT MEKANIS BAJA KARBON

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Pada dasarnya sifat mekanik dan struktur mikro baja karbon akan berubah selama proses pengelasan dengan perlakuan *Preheat* (pemansan awal sebelum mengelas) yang berbeda pada baja karbon JIS G3101 SS400, AISI 1040, AISI 1060. Maka pada penelitian ini akan dikaji perlakuan suhu *Preheat* yang berbeda dengan material yang berbeda spesifikasi materialnya, untuk mengetahui kekuatan tarik, ketangguhan, kekerasan dan struktur mikro. Proses sebelum pengelasan *base metal* (material yang dilakukan pengelasan) dibentuk *bevel single V* atau *V-Groove*, kemudian dilakukan varian *preheat* 100°C, 150°C, dan 200°C. Pada masing – masing spesifikasi material pengujian yang dilakukan adalah: Pengujian Tarik, Impak, *Hardness* dan pengujian Mikro. Nilai kekuatan tarik terbaik pada *preheat* dengan suhu 200°C yaitu pada material AISI 1060 adalah 653 N/mm² lebih tinggi dari SS400 dan AISI 1040 dengan *preheat* 200°C yaitu 493 N/mm² dan 645 N/mm². Nilai ketangguhan terbaik pada *preheat* dengan suhu 200°C yaitu pada material AISI 1060 adalah 489.08 joule/mm². Nilai kekerasan terbaik yaitu pada material AISI 1060 pada lokasi daerah pengelasan suhu 100°C adalah 190 HVN, suhu 150°C adalah 201 HVN, dan 200°C adalah 222 HVN.

Kata Kunci : Baja Karbon JIS G3101 SS 400, AISI 1040, dan AISI 1060 *Preheat* Suhu 100°C, 150°C, 200°C.

ABSTRACT

INFLUENCE OF PREHEATING TEMPERATURE ON THE SMAW WELDING RESULTS ON THE MECHANICAL PROPERTIES OF CARBON STEEL

Basically the mechanical properties and microstructure of carbon steel will change during the welding process with higher Preheat preparation (preheating before welding) on carbon steel JIS G3101 SS400, AISI 1040, AISI 1060. So in this study the discussion of different temperatures with different materials with the specifications of the material, to determine the tensile strength, toughness, struggle and microstructure. The process before welding the base metal (material carried out welding) to form a single bevel V or V-Groove, then do preheat variations of 100°C, 150°C, and 200°C. In each of the specifications of the tests carried out are: Tensile, Impact Testing, Hardness and Micro testing. The best tensile strength value at preheating with a temperature of 200°C is that the AISI 1060 material is 653 N / mm² higher than SS400 and AISI 1040 with preheating 200°C to 493 N / mm² and 645 N / mm². The best value of toughness in preheating with a temperature of 200°C, namely the AISI 1060 material is 489.08 joules / mm². The best hardness value of AISI 1060 material at the location of the 100°C temperature welding area is 190 HVN, 150°C temperature is 201 HVN, and 200°C is 222 HVN. Basically the mechanical properties and microstructure of carbon steel will change during the welding process with higher Preheat preparation (preheating before welding) on carbon steel JIS G3101 SS400, AISI 1040, AISI 1060. So in this study the discussion of different temperatures with different materials with the specifications of the material, to determine the tensile strength, toughness, struggle and microstructure. The process before welding the base metal (material carried out welding) to form a single bevel V or V-Groove, then do preheat variations of 100°C, 150°C, and 200°C. In each of the specifications of the tests carried out are: Tensile, Impact Testing, Hardness and Micro testing. The best tensile strength value at preheating with a temperature of 200°C is that the AISI 1060 material is 653 N / mm² higher than SS400 and AISI 1040 with preheating 200°C to 493 N / mm² and 645 N / mm². The best value of toughness in preheating with a temperature of 200°C, namely the AISI 1060 material is 489.08 joules / mm². The best hardness value of AISI 1060 material at the location of the 100°C temperature welding area is 190 HVN, 150°C temperature is 201 HVN, and 200°C is 222 HVN.

Keywords : Carbon Steel JIS G 3101 SS400, AISI 1040, AISI 1060. Preheating temperature 100°C, 150°C, 200°C