Studi mikro struktur dan perilaku mekanik dari hasil resistance spot welding dengan parameter kuat arus listrik pada material bake hardening = Study of microstructure and mechanical behavior of results of resistance spot welding with electric current parameters on material bake hardening

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Abstrak

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Material Bake Hardening merupakan material yang memiliki sifat mudah dideformasi sebelum diberi perlakuan panas dan sulit dideformasi setelah diberi perlakuan panas. Material ini merupakan material baru yang digunakan pada industri otomotif untuk digunakan pada kerangka mobil dan badan mobil. Material ini akan disambungkan menggunakan mesin Resistance Spot Welding. Resistance Spot Welding merupakan salah satu jenis pengelasan yang banyak digunakan di industri otomotif. Penelitian ini bertujuan untuk mengetahui pengaruh dari parameter kuat arus dari mesin resistance spot welding pada material bake hardening. Penyambungan material bake hardening ini dilakukan dengan menggunakan mesin resistance spot welding dengan pemberian kuat arus 8kA, 9kA, 10kA, 11kA dan 12kA. Pengujian yang dilakukan antara lain pengujian kekerasan, geser, pengamatan SEM, dan metalografi. Hasil penelitian menunjukkan bahwa kekuatan optimum yaitu 5,68kN dan kekerasan optimum yaitu 237,34 VHN didapat pada sampel yang diberi kuat arus sebesar 11kA. Pemberian kuat arus diatas 11kA akan menyebabkan penurunan pada kekuatan dan kekerasan. Pola penjejakan kekerasan menunjukkan bahwa daerah nugget memiliki kekerasan yang lebih tinggi dibandingkan base metal. Struktur mikro juga menunjukkan bahwa semakin ke daerah nugget, butir semakin membesar dan fasa bainite bertambah banyak.
<hr>ABSTRACT
Bake Hardening material is a material that is easily deformed before being given a heat treatment and become a hard deformed after being heat-treated. This material is a new material used in the automotive industry for car frame and car body. This material will be welded using Resistance Spot Welding machine. Resistance Spot Welding is one type of welding that is widely used in the automotive industry. This study aims to determine the effect of the current welding parameters of resistance spot welding to bake hardening material. The joining of bake hardening material is performed using resistance spot welding machine with current 8kA, 9kA, 10kA, 11kA and 12kA. Tests performed include hardness testing, shear, SEM and metallography. The results showed that the optimum tensile strength is 5,68kN and optimum Vickers hardness is 237.34 VHN samples were obtained at a current of 11kA. Giving current 11kA above will cause a decrease in tensile strength and Vickers hardness. Hardness distribution of Vickers hardness shows that nugget area has a higher hardness than the base metal. Microstructure also shows that the area to the nugget, grain growing and increasing bainite phase.;Bake Hardening material is a material that is easily deformed before being given a heat treatment and become a hard deformed after being heat-treated. This material is a new material used in the automotive industry for car frame and car body. This material will be welded using Resistance Spot Welding machine. Resistance Spot Welding is one type of welding that is widely used in the automotive industry. This study aims to determine the effect of the current welding

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