

Pengaruh penambahan kadar nodulizer terhadap skin effect dan sifat mekanis pada besi tuang nodular dinding tipis = Effect of addition nodulizer content on skin effect and mechanical properties in thin wall ductile iron / Muhammad Iman Utama

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Deskripsi Lengkap: <https://lib.ui.ac.id/detail?id=20411910&lokasi=lokal>

Abstrak

ABSTRAK

Kebutuhan penghematan energi dunia menuntut untuk melakukan meminimalisasian energi tak terlepas di bidang pengecoran. Penggunaan TWADI (Thin Wall Austempered Ductile Iron) yang didapatkan dari heat treatment TWDI (Thin Wall Ductile Iron) menjadi kandidat yang paling menarik karena ketangguhannya yang sangat tinggi serta biaya lebih murah dan tentunya lebih hemat energi dibandingkan aluminium. Dalam pemrosesan TWADI menemui masalah yaitu perubahan grafit nodul menjadi flakes atau yang dikenal sebagai skin effect dimana skin akan menurunkan sifat mekanis dari TWADI. Penelitian ini mempelajari pengaruh penambahan kadar nodulizer terhadap terbentuknya skin serta pengaruhnya terhadap sifat mekanis. Skin yang didapat pada penambahan 1,1 % nodulizer dengan tebal 40 μm lebih tipis dibandingkan 1 % nodulizer yang memiliki tebal skin 45 μm . Nilai UTS yang didapat oleh penambahan 1,1% nodulizer yaitu 416,5 MPa, lebih tinggi dibandingkan 1 % nodulizer sebesar 387,54 MPa, dimana hal tersebut sejalan dengan nodularitas yang lebih tinggi dengan penambahan 1,1 % nodulizer. Nilai elongasi kedua sampel tidak mencapai 10 % yang dikarenakan terbentuknya kolumnar karbida yang terbentuk dari berlebihnya kadar mangan pada kedua sampel.

ABSTRACT

Recent world energy condition obligates people to reduce quantity of energy usement especially in casting process. Uses of Thin Wall Austempered Ductile Iron (TWADI), which is a heat treatment material from Thin Wall Ductile Iron (TWDI), become a best candidate to replace aluminium in industry due to the fact of its high quality toughness and another mechanical properties, with low producing cost and also low energy production. One of the most issue that have been met in processing TWADI is a phenomenon that nodular graphites turn into flakes shape which will decrease large amount of mechanical properties. This research is studying about the enhancement of content nodulizer for reducing skin thickness and also to increase mechanical properties. The addition of 1,1 % nodulizer that obtained shown an effective result with reducing 11 % thickness of skin compared to the thickness of addition 1 % nodulizer. The thickness of skin with addition 1,1% nodulizer is 40 μm , while with addition 1 % nodulizer is 45 μm . The UTS number that has been reached by 1,1 % nodulizer is 416,5 % MPa, which is bigger than the UTS of 1 % nodulizer in the amount of 387,54 MPa which also as a result of greater nodularity of 1,1 % nodulizer. The elongation of both sample have elongation below 10 %, as result of carbides that have been formed in the microstructure, because of excessive number of manganese.