

ABSTRAK

EFEK *PRESTRAIN* PADA *STAINLEES STEEL 304* TERHADAP PERAMBATAN RETAK FATIK

Oleh:

I KOMANG SUARIANDI

Perambatan retak fatik *Stainlees Steel 304* yang diberi *prestrain* sebesar 1%, 3% dan 5% menggunakan mesin MTS Landmark 100 kN pada temperatur ruang. Hasil pengujian tarik menunjukkan efek *prestrain* meningkatkan kekuatan mekaniknya seperti tegangan luluh dan tegangan maksimumnya, namun keuletan baja menurun. Laju perambatan retak fatik (da/dN) *Stainlees Steel 304* yang tidak diprestrain $da/dN=6,17 \times 10^{-9} K^{1,323}$, *prestrain* 1% $da/dN = 6,28 \times 10^{-9} K^{1,253}$, *prestrain* 3% $da/dN=8,18 \times 10^{-9} K^{1,181}$ dan *prestrain* 5% $da/dN=22,52 \times 10^{-9} K^{0,825}$. Berdasarkan nilai laju perambatan retak fatik, *prestrain* menurunkan laju perambatan retak fatik *Stainlees Steel 304*. *Prestrain* yang diberikan pada *Stainlees Steel 304* merubah orientasi dan ukuran butirnya. *Prestrain* menyebabkan ukuran butir mengecil, spesimen tanpa *prestrain* memiliki ukuran diameter butir rata-rata $d_b=0,0997$ mm, *prestrain* 1% $d_{1\%}=0,0651$ mm, *prestrain* 3% $d_{3\%}=0,0539$ mm dan *prestrain* 5% $d_{5\%}=0,0509$ mm. Ukuran butir mengecil seiring dengan besarnya *prestrain* yang berkontribusi menurunkan laju perambatan retak fatiknya.

Kata Kunci : *stainlees steel 304*, *prestrain*, retak fatik, ukuran butir.

ABSTRACT

THE EFFECT OF PRESTRAIN OF STAINLEES STEEL 304 ON FATIGUE CRACK GROWTH

By:

I KOMANG SUARIANDI

Fatigue crack propagation Stainless Steel 304 is given prestrained 1%, 3% and 5% used the Landmark MTS 100 kN at room temperature. The tensile test results show the prestrain effect increases the mechanical strength such as yield strength and ultimate tensile strength, but the steel toughness was decreases. Fatigue crack propagation rate (da / dN) Stainlees Steel 304 which is not prestrained $da/dN=6,17 \times 10^{-9} K^{1,323}$, prestrain 1% $da/dN = 6,28 \times 10^{-9} K^{1,253}$, prestrain 3% $da/dN=8,18 \times 10^{-9} K^{1,181}$ and prestrain 5% $da/dN=22,52 \times 10^{-9} K^{0,825}$. Based on the rate of fatigue crack propagation, prestrain decreases the rate of fatigue crack propagation of Stainlees Steel 304. The prestrain given to Stainless Steel 304 for changed the orientation and size of the grains. Prestrain causes the grain size to decline, specimen without prestrain has average diameter size $d_{bs}=0,0997$ mm, prestrain 1% $d_{1\%}=0,0651$ mm, prestrain 3% $d_{3\%}=0,0539$ mm dan prestrain 5% $d_{5\%}=0,0509$ mm. The size of the grains has declined with the amount of prestrain given which contributed to the decreasing rate of fatigue crack growth.

Keywords: stainlees steel 304, prestrain, fatigue crack growth, grain size.