ANALYSIS OF CORROSION RATE USING THREE CELL ELECTRODE ELECTROLYSIS METHOD ON 2205 DUPLEX STAINLESS STEEL DUE TO LINE HEATING PROCESS

ABSTRACT

Hot forming in a production process of ship is often done without standardization limits of temperature that could be used. Whereas, each material which want to do hot forming have different effect due to difference on its chemical composition. As example is 2205 duplex stainless steel. 2205 duplex stainless steel has sigma phase, that could happen at temperature between 700ºC to 975ºC. Cause on field there are no limitation in temperature could be used, so the heat treatment over 700ºC possibly happen. And it cause the increasing of ferrite content on 2205 duplex stainless steel. Increasingly ferrite content on 2205 duplex, make into decreasingly corrosion resistance of 2205 duplex.

One of hot forming that common to be done is line heating. Line heating process in 2205 duplex stainless steel can change microstructure and then will change basic characteristic of 2205 duplex too. Many factor influencing the changing of microstructure because of line heating, and there is the rapid cooling.

In this research there are three material 2205 duplex which would be line heating until the material reach different deformation. The deformation variation that happen are 1 mm, 2 mm and 3,5 mm. From three material have be done with line heating, then test specimen taken transverse with line heating pattern. Three test specimen have been taken from each deformation variation then doing photo micro and corrosion rate test. From data analysis of photo micro, that more time on doing line heating process then ferrite content will increase. Ferrite content increase 28,19% in material with 1 mm deformation. Ferrite content increase 34,04% in material with 2 mm deformation, while in 3,5 mm deformation ferrite content increase 37,04%.

In corrosion test with ferric chloride as corrosive medium, the corrosion result on 1 mm, 2 mm and 3,5 mm deformation are 0.03176 mmpy, 0.03189 mmpy and 0.03576 mmpy. And then
could be known that corrosion rate will increase as way as increasingly deformation plate cause line heating.

**Key words**: Duplex Stainless Steel 2205, Sigma phase, Line heating, Deformation Plate, Ferrite content, Corrosion Rate