

Optimasi Electrodeposition Dengan Menggunakan Metode Deep Neural Network (DNN) Pada Rectifier Dalam Proses Pengecatan = Optimization Electrodeposition With Deep Neural Network (DNN) Method On Rectifier In Painting Process

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Abstrak

Kendaraan mobil penumpang sebagai transportasi telah banyak beredar karena harga yang begitu kompetitif. Harga kompetitif dibuat dengan mengefisiensikan biaya proses produksi, proses painting salah satunya. Pada proses painting memakan biaya paling besar yaitu proses electrodeposition (ED). Biaya yang besar diakibatkan karena ketebalan cat ED tidak merata dan jauh melebihi standar. Perlunya mendesain sistem proses ED untuk menjaga ketebalan cat tetap standar dengan mengatur tegangan rectifier menggunakan metode deep neural network (DNN). Input berupa kecepatan pendulum carier bodi unit, mengatur beberapa parameter material seperti additive, solvent, pigment, resin, neutralizer selanjutnya data parameter diproses dengan DNN untuk memberikan input rerspon dengan berbagai keadaan yang telah diatur melalui aktifitas data threshold melalui metode feedforward backpropagation agar pulsa thyristor mampu memberikan sinyal tegangan rectifier sesuai keadaan jenis bodi mobil dan material painting sehingga ketebalan material cat yang di aliri tegangan akan merata pada seluruh permukaan bodi unit dengan ketebalan yang standar. Hasil yang didapatkan dari simulasi sistem ini bahwa ketebalan cat yang lebih optimal sesuai standar $15\frac{1}{4}\mu\text{m}$ dengan penurunan pemakaian material sebesar 40%. Akurasi tegangan yang dikeluarkan rectifier sebesar 99,9%. Dengan digunakannya sistem DNN pada rectifier untuk proses painting maka dapat memotong biaya proses produksi menjadi lebih murah sebesar maksimal 40%, IRR sebesar 15% untuk investasi Rp. 2.000.000.000,- selama 5 tahun.

.....Passenger cars as transportation have been widely circulated because the prices are so competitive. Competitive prices are made by streamlining the cost of the production process, the painting process is one of them. In the painting process, the highest cost is the electrodeposition (ED) process. The high cost is due to the uneven thickness of the ED paint and it far exceeds the standard. The need to design an ED process system to maintain a standard paint thickness by adjusting the rectifier voltage using the deep neural network (DNN) method. The input is the speed of the pendulum carrier body unit, adjusts several material parameters such as additive, solvent, pigment, resin, neutralizer then the parameter data is processed by DNN to provide response input with various conditions that have been set through threshold data activities through the feedforward backpropagation method so that the thyristor pulses can provide a rectifier voltage signal according to the state of the car body type and painting material so that the thickness of the paint material that is applied to the voltage will be evenly distributed over the entire surface of the unit body with a standard thickness. The results obtained from the simulation of this system are that the paint thickness is more optimal according to the 15 standarm standard with a 40% reduction in material usage. The accuracy of the voltage issued by the rectifier is 99.9%. With the use of the DNN system on the rectifier for the painting process, it can cut the cost of the production process to be cheaper by a maximum of 40%, IRR of 15% for an investment of Rp. 2,000,000,000,- during 5 years.