

INTISARI

Penelitian perancangan dan analisis kekuatan *Station Liquid Handling System Trainer* bertujuan untuk merancang sebuah *station* yang digunakan untuk menopang *Liquid Handling System Trainer*. Metode yang digunakan dalam perancangan dibagi menjadi tiga proses yaitu perancangan tiga variasi model *station*, analisis kekuatan *station*, dan perbandingan variasi *station* berdasarkan kekuatan, biaya, dan proses manufaktur. Berdasarkan metode yang digunakan, penelitian menghasilkan tiga variasi rancangan yang telah sesuai dengan *design requirements*. Ketiga rancangan dilakukan analisis kekuatan yang akan dibandingkan bersama dengan parameter biaya dan proses manufaktur. Rancangan terpilih adalah *design model 1* yang dirancang menggunakan material *sheet metal* sepenuhnya dengan material tipe baja ASTM A36. Analisis kekuatan yang dilakukan pada rancangan *design model 1* menunjukkan tegangan maksimal sebesar 34,07 Mpa yang terjadi di sekitar lubang baut roda *station*, dan deformasi terbesar sebesar 0,068 mm yang terjadi di tengah *workspace aluminium profile*. Perhitungan *safety factor* dari rancangan menunjukkan angka sebesar 7,33 baik dari *software* maupun perhitungan manual. Biaya bahan baku yang diperlukan untuk pembuatan rancangan *station* terpilih adalah yang terkecil yang sebesar Rp2.220.000.

Kata kunci: *finite element analysis, staion, liquid handling system, trainer*.

ABSTRACT

Research on the design and strength analysis of Liquid Handling System Trainer Stations aims to design a station that is used to support the Liquid Handling System Trainer. The method used in design is divided into three processes, namely designing three variations of station models, analyzing station strength, and comparing station variations based on strength, cost, and manufacturing process. Based on the method, the research produced three design variations that were in accordance with the design requirements. The three designs are subjected to strength analysis which will be compared along with cost and manufacturing process parameters. The selected design is design model 1 which is designed using completely sheet metal material with ASTM A36 steel type material. The strength analysis carried out on the model 1 design showed that the maximum stress was 34.07 MPa which occurred around the station wheel bolt holes, and the largest deformation was 0.068 mm which occurred in the middle of the aluminum profile workspace. The safety factor calculation of the design shows a figure of 7.33 from both software and manual calculations. The cost of raw materials required to make the selected station design is the smallest, amounting to IDR 2,220,000.

Keywords: *finite element analysis, staion, liquid handling system, trainer.*