

ELR Employment Projects - Confidential

Sector:

Date:

1974

1975

Org:

Rose Forgrove

Selborne Eng.

Education

Project:

Machine shop practice

Fabrication shop practice

Detail:

Under Training

Role:

Student

Activity:

Working with machine tools & weld

ing

Resources:

Milling machines, lathes, router, fits & tolerances, assembly;

Gas cutting, plate bending & shearing, setting-out & welding

Description:

Six months training in machine shop practice. a number of bench tools were made using appropriate machine and hand tools, according to production drawings and were then assembled. These included: engineer's vice, tap wrench, tool maker's clamps, vee blocks, odd leg callipers, centre punch, soft face mallet.

Supervision was given by the training officer to satisfy the requirements of instruction and safety.

Six month training in fabrication shop practice. the training was based on the production of access equipment.

Machine tool usage in production was with: sawbench, bandsaw, pillar drill, bench grinder, circular saw, power press, folding brakes, shearing machine.

Components were typically joined by arc welding, consequently instruction was received in: arc welding (including position and thin section techniques), welding jigs, gas cutting.

Finishing work involved: platform assembly, chain rigging assembly, spray painting.

ELR Employment Projects - Confidential

Sector:

Date:
1986-1987

Org:
Cranfield University Education

Project:
Development

Detail:

Finite Element Analysis of a Fibr

Reinforced

Role:
Student

Plastic Structure

Activity:
Design Analysis

Resources:

SDRC FEA, hand calculations and self-developed programs for vehicle loading analysis and FRP composite properties

Description:

The March 86C was the subject of this work, concerned with Finite Element Analyses with quasi-static load cases. It was necessary to perform five main analyses: (i) Nodal Stress Balance; (ii) Surface Co-ordinates; (iii) Composite Material Properties; (iv) Road Vehicle Performance Estimation; (v) Wheel Applied Forces.

Three significant difficulties were identified in the course of the work: (i) relation between the equivalent elastic constants & angle of reference axes; (ii) representative bending & membrane stiffnesses using thin shell elements; (iii) non-linear relation between wheel force sets & combined vehicle accelerations.

Study on the formulation of FRP elastic properties as used with F.E. programs. The variation of the equivalent elastic constants with angle of reference axes was identified and the affects of this in Finite Element Analysis was considered.

Results: Example Plot showing Strain Energy Density Distribution. There is benefit to vehicle performance in maximising structural stiffness. This allows best control of wheel-road contact geometry. The purpose of these plots was to identify regions of the structure that most contributed to flexibility.

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Sector:

Date: Org:
1997 Engineering Council Education
1986-1987 Cranfield University
1973-1976 Northumbria University

Detail:
Lectures (examined *)

Role:
Student Activity:

Resources:

Description:

MSc Structural Design lectures:
Structural Analysis *
Structural Stability *
Finite Element Analysis *
Fibre Reinforced Plastics *
Fracture & Fatigue *
Dynamics & Random Vibrations
Plates & Shells
Structural Optimisation
Aerospace Structural Layout

Engineering Council Part II Examinations:
Dynamics of Mechanical Systems *
Mechanics of Solids, Materials *

HND Mechanical Engineering lectures:
Mathematics *
Mechanics *
Fluids *
Thermodynamics *
Materials *
Design *
Production & Control *