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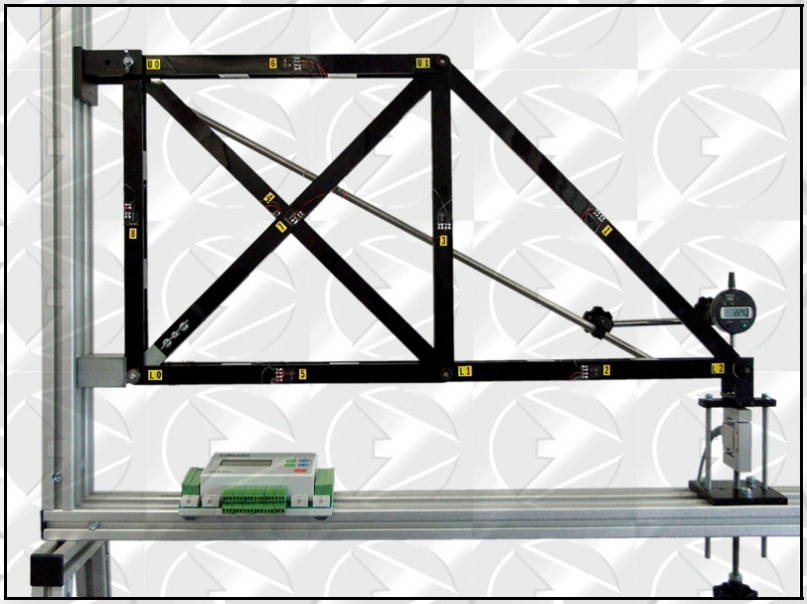
HI-TECH EDUCATION

PRODUCT DATA SHEET

HST16 – Redundant Truss



(HDA200 not supplied)

Product Summary

- Apparatus to demonstrate the redundant member operation within a typical truss arrangement
- Strain in all pin jointed truss members measured using integral strain gauge bridges
- Strain measured and displayed using HDA200 Interface (sold separately)
- Simple mechanism introduces redundant truss member in and out of truss structure
- Self stressing due to lack of fit of redundant member
- Deflection of individual truss joints measured using displacement indicator
- Accurate truss loading through loading device, incorporating load cell
- Member strains, applied load and joint deflection all captured and displayed by HDA200 Interface (sold separately)
- Instruction manual included, containing experiment set-up, procedure, example results and theory
- HST16S Experimental software available
- 2 year warranty

Tender Specification

- To measure the strain and deflection in the individual members of a truly pin jointed truss when a redundant member is added
- To be constructed of a 45° two bay cantilevered truss with seven members and pinned joints
- To include an extra (***redundant***) member with a simple means of adjusting its length into the truss
- To have individual member strain gauging with connecting leads to the HDA200 Interface (sold separately)
- Loaded by an accurate mechanism incorporating electronic load cell
- HDA200 Interface (sold separately) required to view strains, deflection and load applied to truss
- To have separately available experiment software which runs with HDA200 to allow capture, storage and manipulation of actual and theoretical experiment values
- Displacement indicator provided for joint deflection measurement
- Comprehensive technical manual for student and lecturer
- 2 year warranty

The policy of P.A.Hilton Limited is one of continual improvement and they reserve the right to revise this specification without notice.

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Description

The 45° two bay truss consists of seven members with pinned joints cantilevered from the vertical member of the HST1 Universal Frame and Stand (not supplied) using an upper springing and supported by a roller bearing on a vertical track at the lower springing. An extra diagonal member with its length adjustable by a simple mechanism is provided to make the first bay of the truss **redundant**.

Each truss member incorporates a strain gauge bridge arrangement for direct measurement of strain. Each strain gauge bridge connects to the HDA200 Interface (sold separately). To minimise creep and remove the need for bulky cast iron weights, the load is applied to the truss by a unique loading device incorporating a fine screw jack mechanism. Incorporated within this loading device is a load cell (500N) which connects directly to the HDA200 Interface (sold separately). This screw jack mechanism gives smooth accurate loading and unloading.

A digital displacement indicator measures the deflection of the joints and can be located around the truss from the HST1 Universal Frame and Stand (sold separately). The experiment can quickly and easily be assembled in the HST1 Universal Frame and Stand (sold separately).

The HDA200 Interface is sold separately as an essential extra. The member strains, truss applied load and joint deflections are all captured and displayed using the HDA200 Interface. Each parameter is displayed with its engineering units, i.e. strain (με), Newton (N), and millimetre (mm).

To compliment the HST16 hardware, the HST16S Experimental Software is available giving the student an opportunity to simulate the experiment, varying a broader range of experiment parameters and to compare actual results with theoretical results when the experiment is run with the software. When the HST16 hardware is purchased with a dedicated HDA200 Interface as an essential extra the experiment software, HST16S, is supplied as standard.

Supplied with this experiment are a comprehensive instruction manual, all necessary tools and accessories and a 2-year warranty.

Experimental capabilities

- Comparison of experimental forces with theoretical values
- View and record the effect of lack of fit of the redundant member into the truss
- Study of deflection of a truss with and without redundancy
- Study of strains, forces and deflections in a determinate and indeterminate framework

Specification

- Applied load measured using 500N load cell, measuring resolution 0.1N
- Strain gauge technology (half bridge) used on each truss member
- Deflection measured using digital deflection indicator (0.01mm resolution) with connecting lead
- 45° two bay truss
- Vertical and horizontal members 400mm centres
- HST1 and HDA200 essential requirements (sold separately)
- Dimensions: 900(L) x 200(W) x 500(H) mm (approximately)
- Weight: 8kg (approximately)

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Accessories and spares

- Text book
- Full instruction manual which includes:
  - o Operating instructions
  - o Experimental set-up
  - o Experiment procedure
  - o Example set of results

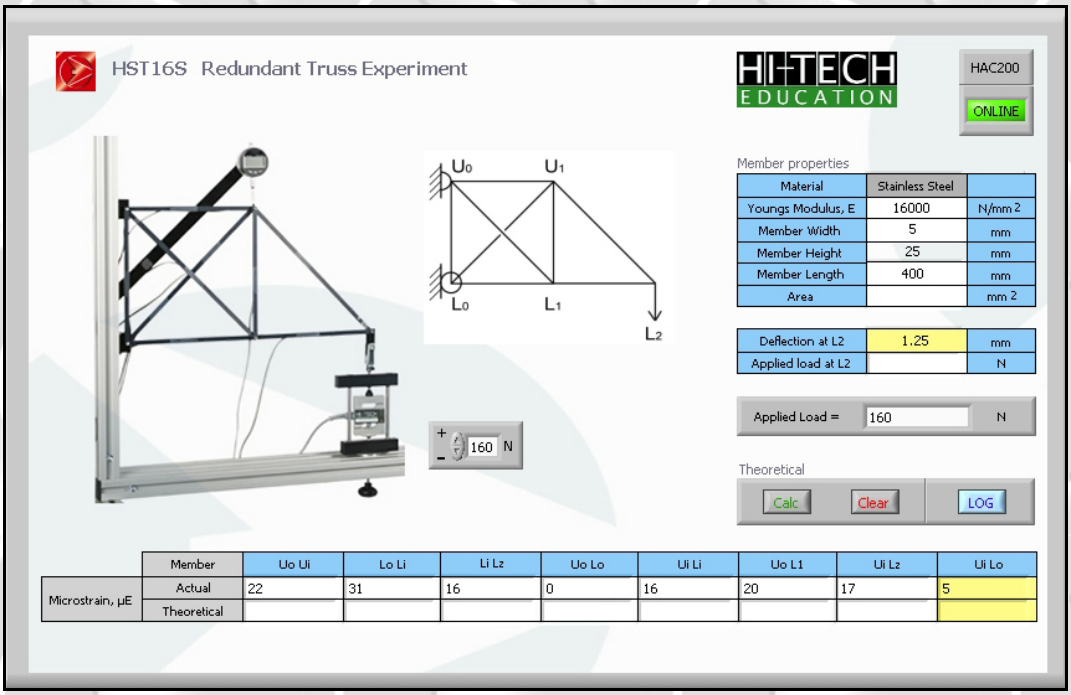
Essential Extra

- HST1 Universal Frame and Stand
- HDA200 Interface

Operational Conditions

- Storage temperature: -10°C to +70°C
- Operating temperature range: +10°C to +50°C
- Operating relative humidity range: 0 to 95%, non condensing

HST16S – Experiment Software



The HST16S experiment software is supplied with the HDA200 Interface when the HDA200 interface is purchased as an essential extra with the HST16 hardware. The HST16S experiment software allows the student to simulate the hardware experiment with or without the experiment hardware being connected.

When the hardware is connected, via the HDA200 (sold separately), theoretical results can be compared to actual results from the hardware. The results can then be compared in the on screen table provided. When the hardware is not connected only theoretical results can be obtained.

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Key parameters can be changed by the end user to broaden the experiment results they can obtain. These include:

- Material
- 'E' value
- 'I' value
- Member width
- Member height
- Member length
- Applied load
- Position of deflection indicator

These parameters can be adjusted on screen using either typed values or the software buttons.

All data captured is stored on the host computer for further manipulation using ***EXCEL*** if required.

Minimum System requirements:

- Intel® Pentium® or equivalent processor
- Microsoft® Windows® 95, 98, NT, 2000, ME or XP operating systems
- VGA Monitor capable of at least 16-bit colour at 800 x 600 resolution
- 32Mb space available on hard drive
- CD-ROM and floppy disk drive
- USB1.1 and USB2 for connecting HDA200 Interface

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