



MAKMAL MEKANIK PEPEJAL

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**KETUA MAKMAL
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TESTING AND EQUIPMENTS

 A photograph of a universal testing machine in a laboratory setting. The machine is a large, industrial-grade device with a vertical column and a horizontal crosshead. It is positioned on a wooden table next to a computer workstation with a monitor and keyboard. A red date stamp '10 7 2007' is visible in the bottom left corner of the image.	<p><u>FUNCTION</u></p> <ul style="list-style-type: none">• For the tensile, compression, bend and shear test of various metal material, or plastic, concrete, cement and other non-metal material. Attached with some simple fittings, it can be used to test performances of adhesive tape, chain, steel wire, electric welding rod, tile and structure parts.
<p>UNIVERSAL TESTING MACHINE</p>	
 A photograph of a buckling of struts apparatus. The apparatus consists of a vertical frame with a central column and a horizontal crosshead. It is placed on a wooden table. A red date stamp '10 7 2007' is visible in the bottom left corner of the image.	<p><u>FUNCTION</u></p> <ul style="list-style-type: none">• Buckling of Struts teaching apparatus enables a range of laboratory, classroom and computer-based experiments for civil, mechanical and structural engineering students to explore buckling behaviour and the relationship between strut length, end fixing conditions and buckling load.• Experiments include:<ul style="list-style-type: none">- Euler buckling loads- Relationship between strut length and collapse load- Relationship between various end-fixing conditions and collapse load- Nature of deflection and deflected shapes with various end-fixing conditions
<p>BUCKLING OF STRUTS</p>	



FUNCTION

- The main component of this table unit is a thin-walled metal cylinder. It is sealed on one side with a piston which can be repositioned with a hand wheel. This makes it possible to create either the dual-axis stress state of a sealed container or the single-axis stress state of a tube. The cylinder is filled with oil and is hermetically sealed and maintenance-free. The internal pressure is generated with a hand-activated hydraulic pump and displayed on an easy-to-read manometer. Five measuring tapes are attached around the perimeter at angles of 0°, 30°, 45°, 60° and 90° to the cylinder axis to measure the elongation. The unit is used in conjunction with the measuring amplifier FL 151.
- Learning Objectives / Experiments
 - Determination of the principal stresses of an open cylinder (open tube)
 - Determination of the principal stresses of a closed cylinder
 - Comparison of open/closed cylinders
 - Determination of transversal contraction coefficient

THIN CYLINDER APPARATUS



FUNCTION

- Davits and curved bars are simple and common structures. Examples of where you can see them include the structures used on ships to suspend lifeboats and along railway tracks to suspend electricity cable. A limiting factor in the design of these structures is the deflection caused by the load they will suspend. In this experiment we will load each of the four structures and measure the horizontal and vertical deflection and compare this to theory

DEFLECTION CURVED BARS AND DAVITS



THICK CYLINDER APPARATUS

FUNCTION

- This table-top unit demonstrates the normal distribution of stress in the radial, tangential and axial directions in the wall of a container under internal pressure, and allows theory to be checked experimentally. A thick-walled aluminum cylinder is placed under internal pressure using a hand pump; the pressure is displayed on a manometer. The hydraulic system is hermetically sealed and maintenance-free. Strain gauges are fitted at various radii in a joint in the cylinder. Using these gauges, it is possible to fully record the strain in the cylinder. For this purpose, the FL 151 Multi-Channel Measuring Amplifier is used as an accessory. The actual stresses are calculated from the strain measurements. All components are fitted to a portable base plate..
- Learning Objectives / Experiments
 - Measurements of strain in the wall of a cylinder under internal pressure
 - Determination of the distribution of stress in the container wall
 - Investigation of the relationships between, strain, stress and load
 - Usage of Mohr's circle.



SHEARING FORCE

FUNCTION

To produce skilful university students in obtaining information, invention and work production using both professional methods and experiment procedures.



PHOTOELASTIC UNIT

FUNCTION

- This is an ideal system to be used in STRENGTH OF MATERIALS. When you are bending or pressing, twisting, strengthening, etc. a probe many things happen in the molecules of the material, that normally you cannot see. It is very interesting to explain to the student how the forces are working in any particular probe. Using this system you can see how all the forces are moving inside the material. Any piece of material supporting forces in different ways can be seen. The test pieces (probes) simulate small scale industrial elements, but the material composition is the key of the system. Examples of these elements are: beams, notches, arches, and any element supporting same forces.



STRAIN GAUGES

FUNCTION

- Experimentation system demonstrating the fundamentals of strain gauges. Tensile, bending and torsion experiments using strain gauges in a full bridge configuration. Test deformation of steel specimens. Measuring amplifier unit with 4-digit digital display.
- Learning Objectives / Experiments
 - Familiarisation with the fundamentals of measuring with strain gauges
 - Familiarisation with strain gauge types and application techniques
 - Calculation of the mechanical deformations under tension, bending and torsion
 - Correlation between mechanical deformation and electrical response in a strain gauge
 - Programming a digital display



UNIVERSAL TESTING MACHINE

FUNCTION

- Tensile, compression, bend and shear test of various metal material and non-metal material, such as plastic, concrete and cement.
- Hydraulic pressure loading, data collecting and treating by computer. Synchronous, direct and convenient display of color screen and microcomputer.
- Automatically zeroing function, no shifting, and resolution ratio reaches 16 bits. All the operations can be completed by clicking mouse according to screen indication.
- It can draw many kinds of testing curves. The functions like curve figure storage and magnification are owned. Data interface is preserved for analysis.

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