Torsional Oscillations Unit

MOT

Engineering and Technical Teaching Equipment

INTRODUCTION

Torsion is a typical effort, together with bending (or flexure), of resistant elements found in machinery and in the building industry. It causes a twisting of such elements due to an external applied torque. Specifically, torsional vibrations (or torsional oscillations) can be defined as the periodical movement of a shaft. Therefore, such shaft twists ups around itself, alternating its turning direction. Torsional oscillations are very important in power transmission systems with shafts and couplings. The reason is that in these situations non controlled torsional oscillations can cause transmission failures. The Torsional Oscillations Unit, "MOT", is intended for easy experiments. It enables to illustrate and investigate the torsional oscillation in single rotor, multi-rotor and geared systems.

GENERAL DESCRIPTION

The Torsional Oscillations Unit, "MOT", is intended for easy experiments. It enables to illustrate and investigate the torsional oscillation in single rotor, multi-rotor and geared systems. The unit basically consists of a rigid frame that have some fasteners which enable to situate its different elements. It also has a set of helicoidal springs to simulate long flexible shafts, and a set of discs of varying mass and moments of inertia. Suitable gears of various sizes are provided too to change the gear ratio. Fasteners offer the possibility to modify the arrangement of discs and gears, as well as the use of different types of springs. That enables the study of the different existing systems. Frequency of oscillations is low, that makes a visual count possible. Besides, a line axially drawn on the spring serves to illustrate the elastic line (shape taken by the shaft when being deformed by the torque) and facilitates the experimental location of the nodes.

SPECIFICATIONS

The MOT unit mainly consists of:

Steel structure to place the different elements of the unit.

Six helicoidal torsion springs of different torsion constant:

Two springs of 2 Nm/rad (Approx.)

Two springs of 8 Nm/rad (Approx.)

Two springs of 24 Nm/rad (Approx.)

Eight stainless steel discs of different diameter:

Two discs of 200 mm of diameter.

Four discs of 160 mm of diameter.

Two discs of 120 mm of diameter.

Six stainless steel gears with different number of teeth:

Gear of z = 20.

Gear of z = 40.

Two gear of z = 50.

Gear of z = 60.

Gear of z = 80.

Closure plates.

Protective plate.

Fastening and anchoring elements.

Tools required to change the elements.

Unit provided with brackets to be suspended in the wall or in a frame.

Manuals: This unit is supplied with the following manuals: Required services, Assembly and Installation, Starting-up, Security, Maintenance and Practices Manual.

MOT detail

EXERCISES AND PRACTICAL POSSIBILITIES

1.- Single rotor connected to the free end of a torsionally flexible member.

2.- Single rotor connected to the free end of a series of flexible torsional members.

3.- Two rotors connected to the free ends of a flexible torsional member.

4.- Two rotors connected to the free ends of a series of flexible torsional members.

5.- Three rotors connected by two flexible torsional members.

6.- Two rotors joined to the free end of two flexible members which are connected throug gears whose inertia is appreciable.

RECOMMENDED ELEMENTS (Not included)

- MBU: Universal Bench Mounted Frame.

DIMENSIONS AND WEIGHTS

MOT:

- Dimensions: 700 x 400 x 300 mm approx.

(27.56 x 15.75 x 11.81 inches approx.)

- Weight: 30 Kg approx.

(66 pounds approx.)

MOT/ICAI. Interactive Computer Aided Instruction Software System:
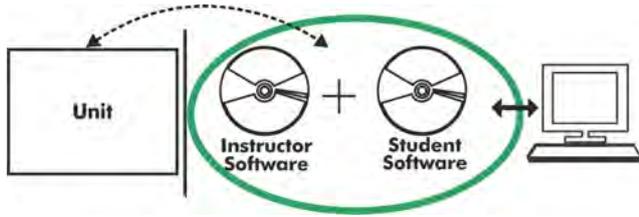
With no physical connection between unit and computer, **this complete software package consists of an Instructor Software (EDIBON Classroom Manager -ECM-SOF) totally integrated with the Student Software (EDIBON Student Labsoft -ESL-SOF).** Both are interconnected so that the teacher knows at any moment what is the theoretical and practical knowledge of the students.

<u>Instructor Software</u>

- ECM-SOF. EDIBON Classroom Manager (Instructor Software).

ECM-SOF is the application that allows the Instructor to register students, manage and assign tasks for workgroups, create own content to carry out Practical Exercises, choose one of the evaluation methods to check the Student knowledge and monitor the progression related to the planned tasks for individual students, workgroups, units, etc... so the teacher can know in real time the level of understanding of any student in the classroom.

Innovative features:

• User Data Base Management.

• Administration and assignment of Workgroup, Task and Training sessions.

• Creation and Integration of Practical Exercises and Multimedia Resources.

• Custom Design of Evaluation Methods.

• Creation and assignment of Formulas & Equations.

• Equation System Solver Engine.

• Updatable Contents.

• Report generation, User Progression Monitoring and Statistics.
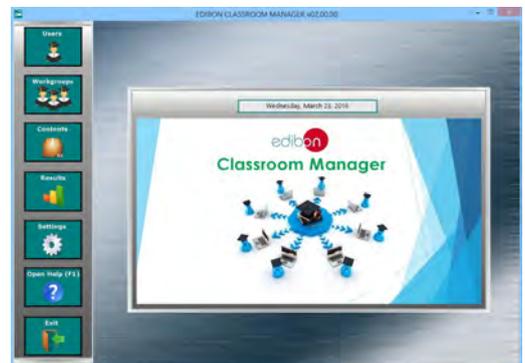
ECM-SOF. EDIBON Classroom Manager (Instructor Software) Application Main Screen
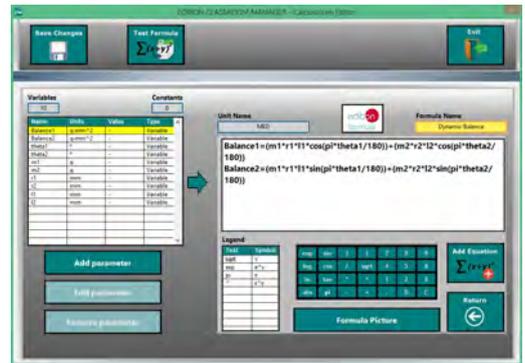
ECAL. EDIBON Calculations Program Package - Formula Editor Screen
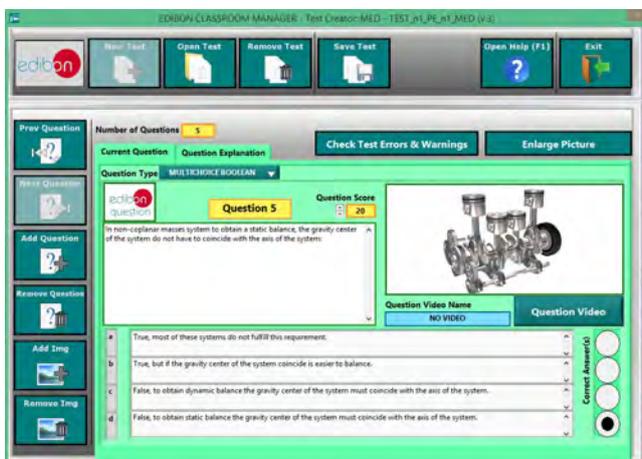
ETTE. EDIBON Training Test & Exam Program Package - Main Screen with Numeric Result Question
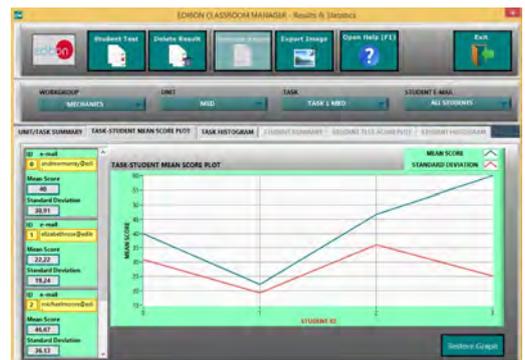
ERS. EDIBON Results & Statistics Program Package - Student Scores Histogram

Student Software

- ESL-SOF. EDIBON Student Labsoft (Student Software).

ESL-SOF is the application addressed to the Students that helps them to understand theoretical concepts by means of practical exercises and to prove their knowledge and progression by performing tests and calculations in addition to Multimedia Resources. Default planned tasks and an Open workgroup are provided by EDIBON to allow the students start working from the first session. Reports and statistics are available to know their progression at any time, as well as explanations for every exercise to reinforce the theoretically acquired technical knowledge.

Innovative features:

- Student Log-In & Self-Registration.
- Existing Tasks checking & Monitoring.
- Default contents & scheduled tasks available to be used from the first session.
- Practical Exercises accomplishment by following the Manual provided by EDIBON.
- Evaluation Methods to prove your knowledge and progression.
- Test self-correction.
- Calculations computing and plotting.
- Equation System Solver Engine.
- User Monitoring Learning & Printable Reports.
- Multimedia-Supported auxiliary resources.

For more information see ICAI catalogue. Click on the following link:

www.edibon.com/en/files/expansion/ICAI/catalog

ESL-SOF. EDIBON Student LabSoft (Student Software)
Application Main Screen

EPE. EDIBON Practical Exercise Program Package Main Screen
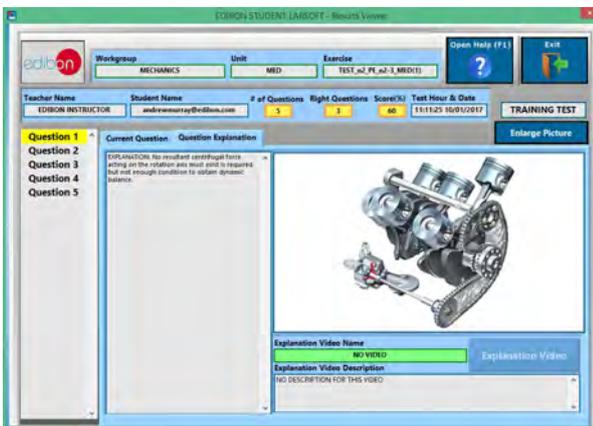
ERS. EDIBON Results & Statistics Program Package - Question Explanation
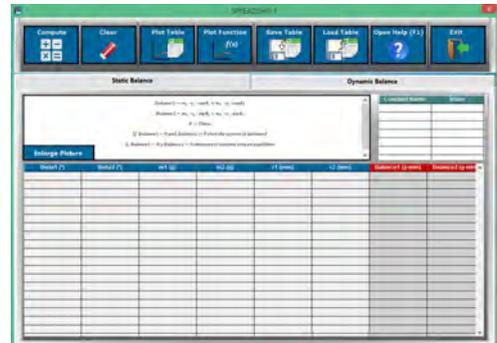
ECAL. EDIBON Calculations Program Package Main Screen

✱ Specifications subject to change without previous notice, due to the convenience of improvement of the product.

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REPRESENTATIVE: