



INTRODUCTION

In the mechanical and civil engineering field, it is important to be able to calculate not only the forces and equilibrium configuration of a structure, but also the capacity of the structures of keeping their equilibrium position in the presence of a perturbation. This characteristic is called stability, and it can be characterized as:

- Stable: if the structure recovers its equilibrium configuration after it is slightly separated from its equilibrium position.
- Unstable: if the structure tends to move away from its equilibrium position after it is slightly separated from it.
- Neutral: if the structure finds equilibrium in the new position after it is slightly separated from its original equilibrium position.

The type of equilibrium given in a structure depends both on its configuration (geometry, types of supports, dimensions and materials of its parts, etc.) and the external loads applied to it. For certain loads smaller than a critical value, the structure behaves as stable; however, for higher values the equilibrium will be unstable. This critical value is known as critical buckling load.

GENERAL DESCRIPTION

The Simple Stability Problems Study Unit, "MEPE", has been designed to study the stability of a bar subjected to buckling by obtaining the critical load in different configurations.

The unit consists of two bars of same length connected by a central low friction joint.

The upper bar is coupled to the fixed system by a movable jointed support. The lower bar is coupled to the fixed system by a fixed jointed support, which can be configured to study an elastic clamp by fixing a sheet made of steel supported at its two ends that acts as torsional spring.

Two springs may be added to the central joint that couples both bars to study an elastic joint. The assembly performs a torque, being equivalent to a torsional spring.

Besides, the unit includes a system to apply a lateral force, which allows to study its effect on the critical buckling load. That system consists of a cable and a mass, which generates a transverse force with respect to the joint in the buckling bar.

The compression load applied to the buckling bar can be continuously varied in all the practical exercises. Thus, the critical value of the load may be calculated more accurately. This system consists of a bar on which masses are applied. The force is transferred to the bar and can be measured with a millimeter ruler.



ISO 9001: Quality Management (for Design, Manufacturing, Commercialization and After-sales service)



European Union Certificate (total safety)



Certificates ISO 14001 and ECO-Management and Audit Scheme (environmental management)



"Worlddidac Quality Charter" and Platinum Member of Worlddidac

SPECIFICATIONS

Bench-top unit with adjustable legs.

Anodized aluminum frame and panels made of painted steel.

The "MEPE" unit mainly consists of:

Two-part buckling bar with a central elastic joint:

Length: 520 mm (length of each part: 260 mm).

Cross-section: 20 x 20 mm.

Material: stainless steel.

The support of the two parts is articulated-articulated.

Device to apply compressive load:

Load application lever with scale.

Length of the load bar: 400 mm.

Device to apply shear force:

Deflection pulley to hold a weight holder and a set of weights.

Elastic clamp fixing to represent a fixed end:

It is formed by a steel leaf spring.

Length: 300 mm.

Cross-section: 10 x 2 mm.

Elasticity modulus: 210000 N/mm².

Elastic joint:

It is formed by two tension springs and a lever arm.

Spring rigidity: 1.67 N/mm.

Lever arm: 55 mm.

Three supports:

One articulated upper support to hold the load application lever, a weight holder and a set of weights.

Two articulated supports to hold the buckling bar and the leaf spring.

Set of weights:

8 x 5 N.

10 x 1 N.

It includes two 1 N weight holders.

Manuals: This unit is supplied with the following manuals: Required Services, Assembly and Installation, Starting-up, Safety, Maintenance & Practices Manuals.



MEPE detail

EXERCISES AND PRACTICAL POSSIBILITIES

- 1.- Theoretical calculation of the critical buckling load in a system with elastic joint.
- 2.- Experimental determination of the critical buckling load in a system with elastic joint.
- 3.- Theoretical calculation of the critical buckling load in a system with elastic support.
- 4.- Experimental determination of the critical buckling load in a system with elastic support.
- 5.- Theoretical study of the relationship between angle and load in a system with elastic joint and lateral force.
- 6.- Experimental determination of the load for the maximum rotation in a system with elastic joint and lateral force.

DIMENSIONS AND WEIGHTS

MEPE:

-Dimensions: 800 x 450 x 1000 mm approx. (31.49 x 17.72 x 39.37 inches approx.)

-Weight: 20 Kg approx. (44.09 pounds approx.)

MEPE/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.

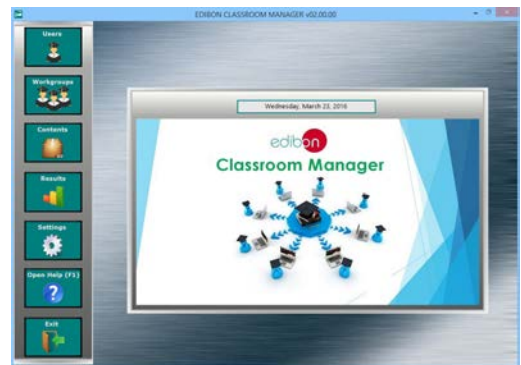
Instructor Software

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

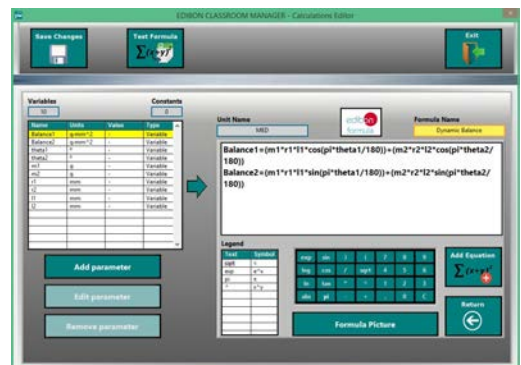
ECM-SOF is the application that allows the Instructor to register students, manage and assign tasks for workgroups, create own content to carry out Practical Exercises, choose one of the evaluation methods to check the Student knowledge and monitor the progression related to the planned tasks for individual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

Innovative features:

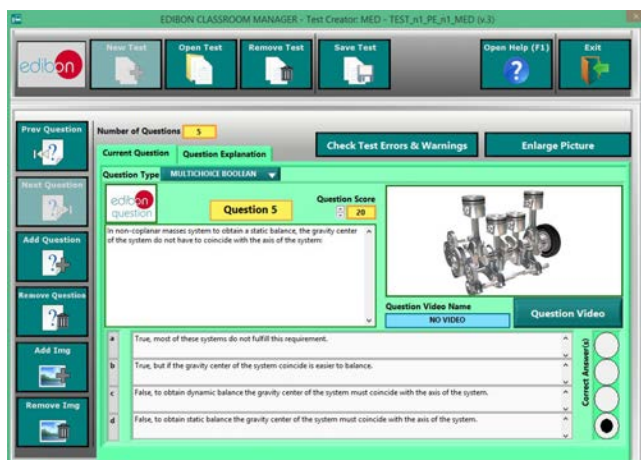
- User Data Base Management.
- Administration and assignment of Workgroup, Task and Training sessions.
- Creation and Integration of Practical Exercises and Multimedia Resources.
- Custom Design of Evaluation Methods.
- Creation and assignment of Formulas & Equations.
- Equation System Solver Engine.
- 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

Optional
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:

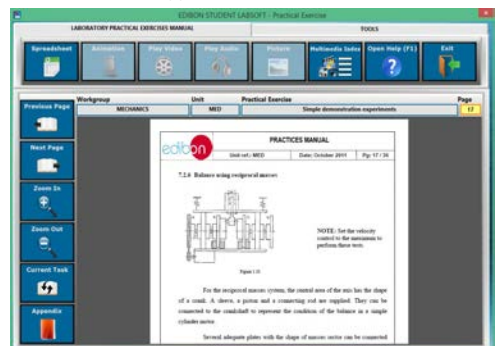
- Student Log-In & Self-Registration.
- Existing Tasks checking & Monitoring.
- Default contents & scheduled tasks available to be used from the first session.
- Practical Exercises accomplishment by following the Manual provided by EDIBON.
- Evaluation Methods to prove your knowledge and progression.
- 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:

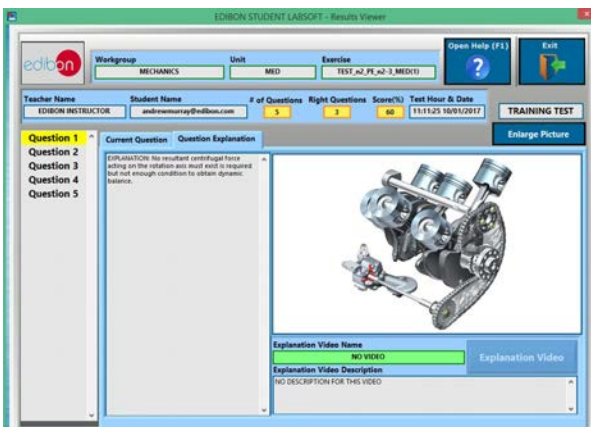
www.edibon.com/en/files/expansion/ICAI/catalog



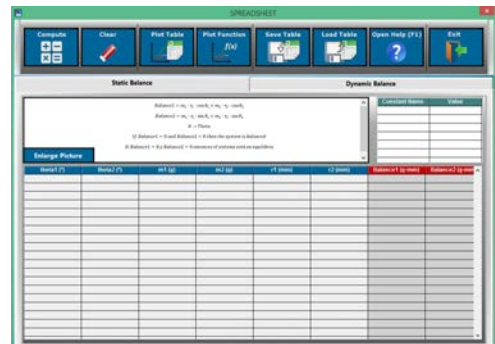
ESL-SOF. EDIBON Student LabSoft (Student Software)
Application Main Screen



EPE. EDIBON Practical Exercise Program Package Main Screen



ERS. EDIBON Results & Statistics Program Package - Question Explanation



ECAL. EDIBON Calculations Program Package Main Screen

BDAS. Basic Data Acquisition System and Sensors:

For being used with mechanical modules.

BDAS is designed to monitor the measurements of each mechanical module from a computer.

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



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REPRESENTATIVE:

