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54 Title: System for measuring perimeter variation in material tests.

57 Summary:
System for measuring perimeter variation in material tests.
The present invention relates to a measurement system capable of determining the perimeter variation of a given section of a specimen during tests for the mechanical characterization of materials. The measurement system devised is based on winding a wire around the section of the specimen of which the perimeter evolution is to be determined . To ensure close contact between specimen and thread, it is necessary to apply a certain tension to the wire, T at its free ends. Thus, the separation of the free ends of the wire, D1, constitutes the perimeter variation of the section analysed.

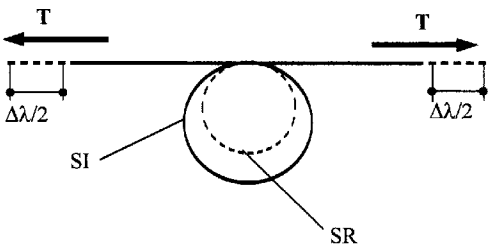

Figura 1

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DESCRIPTION

Perimeter variation measurement system in material testing.

The present invention relates to a system of measurement capable of determining the perimeter variation suffered by a certain section of a specimen during tests of the mechanical characterization of materials. This new system represents an important novelty, because, until now, the determination of the perimeter variation was carried out by means of another meter that is easier to measure, such as the diameter in section specimensCircular approaches, requiring approximations when the material presents significant ovalizations throughout the loading process. Another of the characteristics offered by the system is its simplicity and ease of execution.

Background to the invention

To date, the most widely used system for thedetermination of the perimeter variation consists of obtaining the evolution, throughout the test, of a simpler parameter of measurement.

I would say that the one proposed here, such as the Dia metro in the test tubes of Section circular. Next, it is necessary to assume that the form of the section remains constant throughout the test, in order to be able to calculate the evolution of the per meter.

In specimens, whose section perpendicular to the applied load is circular, it is common to obtain the measurement of the diameter by means of linear extensions or by means of comparators digital (LVDT), which are capable of recording the variation of the distance between two diametrically opposite points of the pro-beta section. The main problem with these techniques is that due to the anisotropy that presupposes the lay a lot of materials, so sections they lose their original shape throughout the test, producing a high dispersion of the results.

In order to solve the aforementioned problems, the Laboratory of the Division of Mathematics Science (LADICIM) of the Department of Science and Engineering of the Terrain and Materials of the University of Cantabria has devised a new system for thedetermination of the perimeter variation of the specimens throughout the character tests. terization of materials, the characteristics of which are the subject of the present invention.

Description of the invention

The system of measurement devised is based on To weave a thread around the Section of the specimen of the which is to determine the perimeter evolution.To ensure close contact between specimen and wire, it is necessary to apply a certain tension, T (Figure I) at its free ends. The Characteristics of the thread dEbera ´n be such that the It does not experience any variation in length throughout the test.

Thus, as the characterization process develops, zada. In any case, the measurement of the perimeter variation corresponds to the variation in the separation of the free ends of the wire, with respect to their position at the beginning of the test.

The measurement of the Separation of the free ends of the thread with respect to their Position initiated, can be realized easily, By means of ex-Tensioners linear ´o by means of comparators(LVDT).

Briefdescription of the drawings

For a better understanding of what is described in this report, some drawings are attached in which, just as an example, a device designed for the determine the perimeter variation, based on the present invention.

Figure 1 shows a simple diagram of the invention, in which it can be seen how the perimeter variation of a Section can be determined Initial (SI) that decreases throughout the trial (SR). The distance $\Delta\lambda/2$ represents the separation of each of the free ends of the wire, so that $\Delta\lambda$ represents the perimeter variation of the section analysed.

the measurement section It is givenWill form´, modifying its geometry. So, yes Figure 1, the free ends of the thread will be separated, $\Delta\lambda$, this separation constituting the perimeter variation of the analytic section.

Figure 2 shows an isom ´e-
A device designed for the determination of perimeter variation , based on the present invention, in which the constituent elements can be appreciated.

Description of a method of carrying out the invention

Figure 2 shows the design of a device for measuring the perimeter variation, based on the present invention.

As can be seen in the aforementioned Figure, the mechanism is extremely simple. When the wire, F, is wound to the specimen, P, the measuring pins, A, close with respect to their initial position, extending the springs, B, which exert sufficient tension to ensure contact between the thread and the specimen.

Once the test has begun, the measuring section of the specimen begins to deform, decreasing or increasing its perimeter according to the type of load, even if this specific performance refers to a typical example of a tensile test. Because of this, the loop that forms the measuring wire, F, around the specimen will close or open, changing the position of the measuring pins A. The variation in the opening of the pads, with respect to the position at the time of starting the test, represents the perimeter variation of the measuring section. To collect this measurement, an extensive linear meter is used, installed on the measuring linkage.

The measuring linkage is composed of a solid bar, C, attached to one of the pins. This rod slides inside the hollow cylinder, D, attached to the other pin. Obviously, both elements are allowed, at their point of union with the corresponding pin, to rotate according to an axis parallel to the rotation of the pins, G, so that they are always parallel to the measuring wire, F.

The linear extra-tensometer should measure the relative position between the elements C and D. In order for the linkage to adapt to long linear meters, with different pin openings, one of

they are installed on the element E, capable of sliding on C, modifying the measurement base.

As can be seen in Figure 2, the power of theSinici´on of the measuring linkage is completely symmetrical with respect to the axis of rotation, G, at the Position of the thread. In this way, the measure collected by the linearextens'ometer , E_1, throughout the test, It corresponds directly to the perimeter variation experienced in the measurement section. In order to stabilize the assembly, avoiding oscillations during the test that could generate a significant noise in the data output, an H-counterweight has been attached, aligned with the axis G.

DEMANDS

1. A system for measuring the perimeter variation of an element, characterised by the fact that the measurement is collected by using a thread, wound around the measuring section.

2. System for measuring the perimeter variation of an element, according to claim 1, characterised by the fact that the ex-

Wire transfers at a tension sufficient to ensure the closest wire-element contact throughout the process of perimeter variation.

3. Perimeter variation measurement system of an element, according to claim 1, characterized by the fact that the measurement of the perimeter variation, as a variation of the separation of the ends of the wire, is recorded.

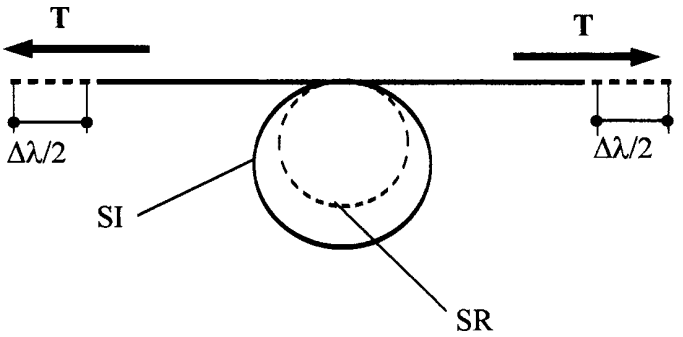

Figura 1

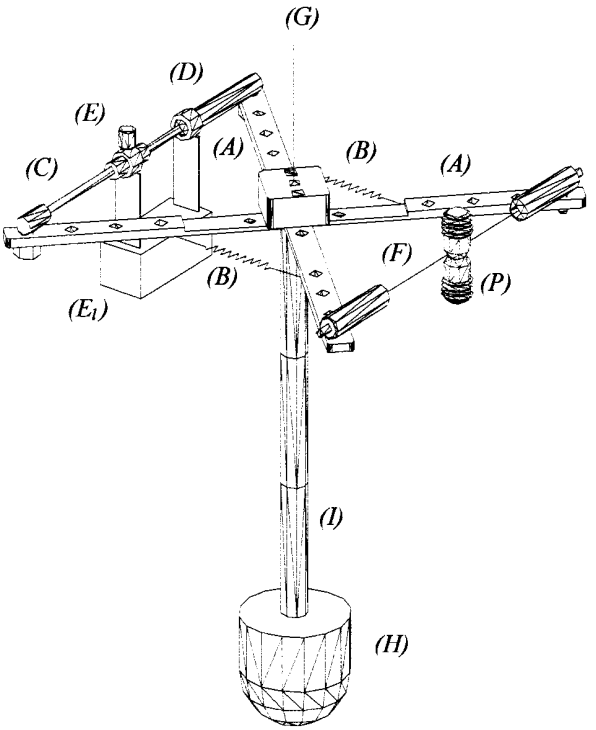

Figura 2

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- Priority Date:

REPORT ON THE STATE OF THE ART

51 Int. Cl.[7]: G01B 5/08, 5/20

RELEVANT DOCUMENTS

Category	Documents cited	Affected claims
X	US 2562749 A (SPEER) 31.07.1944, column 1, line 43 - column 2, line 35; figure.	1-3
X	PATENT ABSTRACTS OF JAPAN, Vol. 10, N° 154 (P-463) CD-ROM PAJ G01 B-L (1/2) 04.06.1986 & JP 61-007401 A (SHIMAZU SEISAKUSHO) 21.06.1984	1-3
X	GB 2118718 A (ROLLS-ROYCE) 02.11.1983, column 1, line 29 - column 2, line 1; figure.	1-3
A	US 2018731 A (LONG) 29.10.1935, the entire document.	

Category of the documents cited

X: of particular relevance

And: of particular relevance combined with others of the same category

A: reflects the state of the technology

Or: referring to unwritten disclosure

P: published between the priority date and the date of submission of the application

E: previous document, but published after the date of submission of the application

This report has been prepared

[X] for all demands

[ ] For claims n°:

Date of preparation of the report	Examiner	Page
28.02.2002	J. Olalde S'anchez	1/17