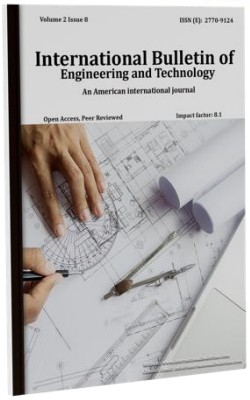

MATERIALS TEST OF CARS METROLOGICAL DESCRIPTION : COMPRESSION AND DISCONNECT THEIR CARS ATTESTATION AND CALIBRATION

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Abstract: Testing equipment used in materials science and mechanical engineering plays a critical role in determining the strength, durability, elasticity, and other mechanical properties of materials and finished products. Ensuring high accuracy, repeatability, and stability of measurements requires particular attention to the metrological performance of testing machines. Calibration is a key process for maintaining the reliability of such equipment. It involves the verification and adjustment of force, displacement, and deformation sensors using traceable reference standards to guarantee the validity and precision of the obtained results.

Keywords: mechanical properties, calibration, measurement accuracy, measurement range, certification, verification, sensor, mechanical assembly, indicated value, measurement errors, force transducers, extensometers.

Introduction

Materials test of cars right calibrated and metrological in terms of certified to be industry products quality increases , uncertainties reduces and international to standards suitable results to take help Metrological description is equipment by executable measurements quality , marginal errors , sensitivity , accuracy and reliability by designating giver indicators is a complex . Try machines , especially universal testing machines (USM), metal , plastic , composite , textile and other construction of materials stretching , compression , bending , stiffness , impact and fatigue such as mechanic properties in measurement wide This is used . of cars metrological description mainly force , displacement , deformation and time such as of parameters clear measured is based on . Therefore for in the car installed sensors , power gauges , extensometers , load cells mechanisms and electronic measurement modules metrological from inspection to pass condition

Metrological descriptions main from the indicators one measurement Accuracy is the accuracy of the of the car measurement result real to value how much closeness defines . Often accuracy in percentages or car to the class (for example , 0.5; 1; 2 class) is determined depending on the level of the upper accurate test machines typically ±0.5% or lower error with This requirement is in accordance with ASTM, ISO, GOST standards . with order is inserted . Accuracy provide for car regular accordingly calibrated , sensors will be replaced and mechanic parts lubricated .

Second important indicator is sensitivity . Sensitivity is measurement equipment the most small changes to be able to record ability . During the testing process of the material deformation very small to be possible , therefore for extensometers sensitivity millimeter out of a thousand one to parts is required to be . High sensitivity of the material modulus of elasticity , Poisson coefficient and other thin parameters clear calculation opportunity gives .

Third main indicator is repeatability . The same to the material one kind under the circumstances one how many there is test when transferred of the results to each other close output of the car repeatability If the repeatability is low , the metrological malfunctions there is to be , sensors broken to be or car wrong adjusted to be possible .

Also , test of cars metrological description calculation range with This is the minimum and maximum speed of the machine . maximum load range . For example , 100 kN to power has test machine from 0.1 kN to 100 kN until was forces reliable measure necessary . Range wrong selection material test to the results negative impact shows , because maximum from the load exceed to leave sensors to injury take is coming .

Metrological descriptions again one element Linearity is linearity . measurement of the results graphic in appearance right to the line how much closeness If the sensor is linear , otherwise , small in cargo error little , big in cargo and high to be It is possible . This is of the material true stress–strain graph wrong harvest does .

Each test car in at least one times state metrology in the centers again from inspection passed . Calibration results special certificate with is confirmed .

Modern test machines digital management systems , automatic information assembly modules , digital filters and real time on computer monitoring with These technologies metrological accuracy increases , human mistakes reduces and test of the results reliability , preservation and again processing relieves .

Materials mechanic properties determination industry , construction , mechanical engineering , metallurgy and research of the sectors inseparable This is part of the process . the most many applicable metrological from tools one — squeeze and disconnect These are machines . cars of the material strength limit , modulus of elasticity , elongation level and to squeeze was resistance in determining main role plays . Test results reliability and of cars metrological to the state directly related is , this the situation regular checking stand attestation and calibration processes through is provided .

Attestation content and necessity — test of the car technician and metrological indicators state or international standards requirements based on assessment and him/her to use suitable that confirmation This process is of the car general mechanic status , sensors sensitivity , strength read flatness and load transfer system stability to determine service does . Attestation main legal and regulatory base as O'z DSt , GOST, ISO 7500-1 and ASTM E4 standards is applied.

First of all , certification in the process of the car external appearance and mechanic composition is checked . In the frame cracks , rust , mechanical loosening , hydraulic in the system malfunctions or electronic blocks from work came out parts If detected , the car from certification not transferable . Next in stages car metrological from the test is carried out . In this case, the car known standard loads in quantity connects and of the car showed values standard values with are compared . Standard loads using of the car accuracy errors , hysteresis , return hard work and repeatability indicators is determined .

If the car designated normative requirements within If it works , it is " Attestation" " passed " certificate with This document is approved . of the car known term during right

performance guarantees and enterprise or in the laboratory transferable of tests reliability basis will be .

Calibration scientific and technical essence — machine showed of values to actual benchmark values relatively the difference determination and this the difference record to grow Calibration is a process . more measurement accuracy to evaluate aimed at is the car accuracy class is exactly the same calibration through is determined . Compression and disconnect machines usually 0.5, 1 or 2 precision to the class is divided .

Calibration in the process to the car different The load is given in the following ranges : 10%, 20%, 40%, 60%, 80% and 100%. At each load level at least three times measurement done is increased . Obtained results between difference of the car accuracy level For example , 100 kN maximum up has disconnect When a load of 50 kN is applied to the machine machine 49.90 kN shows , the error is –0.10 kN what organization The results meet the requirements of ISO 7500-1 . with compared and car designated from the border not exceeded if it is , it is used is considered valid .

Calibration results special certificate — “ Calibration "to the protocol" This document contains load ranges , measurements results , errors , hysteresis , return mistakes and of the car accuracy class Certificate action to do deadline When finished , the car again calibration condition is considered .

Materials test machines with to be held tests many industry in networks solution doer importance For example , construction constructions strength , metal of goods durability , car parts reliability exactly this test machines through is checked . If the machine wrong calibrated if or from the certificate not passed if , the results unreliable This is dangerous constructions to create take arrival possible .

Therefore , each enterprise or scientific laboratory squeeze and disconnect their cars at least every 12 months one times attestation and from calibration This is not only to standards compliance to do , maybe working being released of the product quality provide It is also necessary for .

Conclusion

Conclusion as in other words , materials test of cars metrological description – production issued results accuracy , standards compatibility and scientific of research reliability for the most main Accuracy , sensitivity , repeatability , linearity and calibration such as indicators of the car technician status complete Metrological in terms of right organization done test process industry of products quality increases , scientific of research the results reliable does and international requirements with harmonious to work opportunity creates .

Compression and disconnect their cars attestation and calibration technician of processes reliability and accuracy providing important metrological stages . Attestation of the car technician validity , calibration and measurement accuracy control does . Both process regular when done test results reliable , repeatable and international to standards suitable This is the case . industry safety , product quality and technological of processes stability in providing important importance profession will reach .

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