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# Instrumentation

JULY/AUGUST 2010

TEST ■ MEASUREMENT ■ CONTROL

## SENSORS & TRANSDUCERS

Addressing industry issues

## AUTOMOTIVE & MOTORSPORT

AMR: a solution for drivetrain applications

In house calibration - the cost-effective solution

**CASES & ENCLOSURES:** The housing of choice

# WHY CALIBRATE ?

## TRANSMILLE LOOKS AT THE IMPORTANCE OF CALIBRATION WITHIN INDUSTRY TODAY



### WHAT IS CALIBRATION?

Calibration is the checking of an instrument against a known value to determine its performance compared to this known value. An effective calibration uses a *standard* which is capable of being more precise than the instrument being checked against it, for example checking a clock with **hours** and **minutes** against a clock with **hours, minutes** and **seconds**.

A calibration laboratory will perform this type of calibration to a known standard including points across the span of a range, and on each range where appropriate to ensure a comprehensive record of measurements made, with traceability of these measurements back to National Standards.

### THE ORIGINS OF CALIBRATION

It is believed that early 'calibration' was for trading Silk against gold in Asia where dimensional and weight measurements were needed, even for simple trade.

For many the feeling is calibration is an unnecessary cost - the cost, however, of not calibrating measuring instrument is far higher. All nations realise this and many governments support a national standards policy of some kind.

### SO WHY IS CALIBRATION NECESSARY?

We may not realise this in our day to day life but measurement and calibration are all around us, from the watch on your wrist to the speedometer in our car and we rely on them reading correctly without giving them a second thought - potential consequences of not calibrating may include :



Incorrectly calibrated electricity meters resulting in high readings & excessive charges.



A car fuel gauge reads incorrectly due to being set up with incorrectly calibrated test equipment.



The cost & inconvenience of missing a train because we did not verify our watch read the right time.



Incorrectly measured speed by a roadside camera due to the camera reading too low when cars approach.



The consequences of an incorrectly calibrated altimeter in an airplane would be dramatic.



A manufacturer produces 100,000 USB connectors all the wrong size due to incorrectly adjusted machinery.

As we can see, the effect of calibration is broad and far reaching, influencing many different industries in a multitude of applications - calibration is an important part of the process of providing and maintaining these products and services.

### TRACEABILITY MAKING MEASUREMENTS MEANINGFUL

For a measurement to be meaningful to another person they must be derived from the same source, so my kilogram is the same as your kilogram, so someone, somewhere must keep a single standard and measurements made by your instrument must be traceable back to original source.

This path of measurements and comparisons leading back from the calibration of your instrument to the original master standard is known as Traceability - without traceability a measurement is only a relative to you, and is of no use to anyone else.

It is normally the function of National laboratories to keep the countries standards and there has been a program of research for many years to determine the most accurate and stable standards, for example time / frequency from an atomic clock which can be constructed anywhere in the world and produce the same frequency.



### TRACEABILITY : A HISTORICAL TALE...

The US standard railroad gauge (distance between the rails) is 4 ft, 8 1/2 in. (1.44 m).  
 That's an odd number. Why was that gauge used?  
 Because that's the way they built them in England, and the US railroads were built by English expatriates.  
 Why did the English build them like that?  
 Because the first rail lines were built by the same people who built the pre-railroad tramways, and that's the gauge they used.  
 Why did "they" use that gauge then?  
 Because the people who built the tramways used the same jigs and tools as "they" used for building wagons, which used that wheel spacing.  
 Oh! Why did the wagons use that wheel spacing?  
 Well, if they tried to use any other spacing the wagons would break on some of the old, long distance roads, because that's the spacing of the ruts.  
 So, who built these old rutted roads?  
 The first long distance roads in Europe were built by Imperial Rome for the benefit of their legions. The roads have been used ever since.  
 And the ruts?  
 The initial ruts, which everyone else had to match for fear of breaking their wagons, were first made by Roman war chariots. Since the chariots were made by or for Imperial Rome they were all alike in the matter of wheel spacing (ruts again). Thus, we have the answer to the original question. The US standard railroad gauge is therefore Traceable to the original military specification for an Imperial Roman army war chariot which was designed based on the width of two horses!

FOR FURTHER INFORMATION VISIT  
**WWW.TRANSMILLE.COM**

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# IN-HOUSE CALIBRATION

**VIAIBLE IN-HOUSE CALIBRATION IS A REALITY WITH COST EFFECTIVE, EASY TO USE SYSTEMS FROM TRANSMILLE**

Calibration can be successfully brought in-house using the right test equipment, calibration software and supporting quality system. Transmille has been at the forefront of calibrator and software design for over a decade, with emphasis on the creation of ready to use 'out of the box' systems.

Our experience in the running of a precision laboratory has enabled us to refine the calibration process and produce a commercial calibration system which comes complete with all the measurement and traceability data required to run a professional in-house calibration facility. This comprehensive solution covers the entire process from goods inwards, through to calibration and despatch including printing of professional certificates and labels.

Key to setting up a calibration system is the ease of use of the calibrators and software, which have been designed to de-skill the calibration of instruments such as multimeters, clamp meters and electricians test tools including RCD and Loop testers. A vital component of any calibration system is easy-to-use software with built-in traceability and quality system support. The products below offer a practical solution to realising a cost effective in-house calibration facility :



### IN-HOUSE BENEFITS

- Reduces outsourcing costs
- Calibrate on-site / at multiple sites - Reduce downtime for your engineers
- Schedule to suit your workload
- Create additional revenue by calibrating for clients / partners

### SOFTWARE CALIBRATION

**SOFTWARE**

The complete solution to in-house calibration - easy step-by-step calibration, certificate & test labels printouts with traceability.

### MANAGEMENT

Laboratory management providing goods inwards, job tracking and despatch with instrument re-calibration scheduling.

### MULTIMETERS

### 8000 SERIES - 8 1/2 AND 7 1/2 DIGIT PRECISION MULTIMETERS - COST EFFECTIVE SOLUTIONS WITH ADVANCED FUNCTIONS

- AC/DC VOLTAGE TO 1000V
- AC/DC CURRENT TO 30A
- THERMOCOUPLE (8 TYPES)
- PAT / RTD + RATIO MODES
- ELECTROMETER TO 1TΩ / 100pA
- PRESSURE MEASUREMENT
- DUAL DISPLAY • MENU DIAL FOR EASY SETUP • USB/LAN/GPIB/RS232

**AFFORDABLE PRECISION MEASUREMENT  
USE WITH PROCAL SOFTWARE FOR IN-HOUSE CALIBRATION CAPABILITIES**

### 3000 SERIES - 8 / 25 / 50 PPM MULTI PRODUCT CALIBRATORS - PERFORM CALIBRATION OF MULTIMETERS, CLAMP METERS AND MORE :

- MULTIMETERS
- POWER / CLAMP METERS
- PROCESS CONTROL METERS
- BENCH POWER SUPPLIES
- EXTENDED CAPABILITIES USING ADAPTER INTERFACE

**USE WITH PROCAL SOFTWARE FOR IN-HOUSE CALIBRATION CAPABILITIES  
ALSO AVAILABLE AS TRANSPORTABLE CALIBRATOR FOR INDUSTRIAL ON-SITE ENVIRONMENTS (9000 SERIES)**

### MULTI PRODUCT CALIBRATORS

### ELECTRICAL TEST CALIBRATOR

### 3200 SERIES - CALIBRATE 17th EDITION ELECTRICIANS TEST TOOLS WITH EASE :

- INSULATION TESTERS
- RCD TESTERS
- LOOP TESTERS
- PAT TESTERS
- DEDICATED FUNCTION BUTTON FOR EACH TESTER
- INTUITIVE TO USE WITH MINIMAL TRAINING

**USE WITH PROCAL SOFTWARE FOR IN-HOUSE CALIBRATION CAPABILITIES  
ALSO AVAILABLE AS TRANSPORTABLE CALIBRATOR FOR INDUSTRIAL ON-SITE ENVIRONMENTS (9000 SERIES)**

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