Twinning Project “Strengthening the capacities of the Bureau of Metrology for internal market integration”
Twinning ref. MK 12 IPA EC 01 16 TWL

A Project funded by the European Union and Implemented and led by CMI

IMPORTANCE OF LEGAL METROLOGY AND ITS INTERNATIONAL STRUCTURE

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This Project is funded by the European Union

Project Implemented by the CMI

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LEGAL METROLOGY

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TWINNING

LEGAL METROLOGY

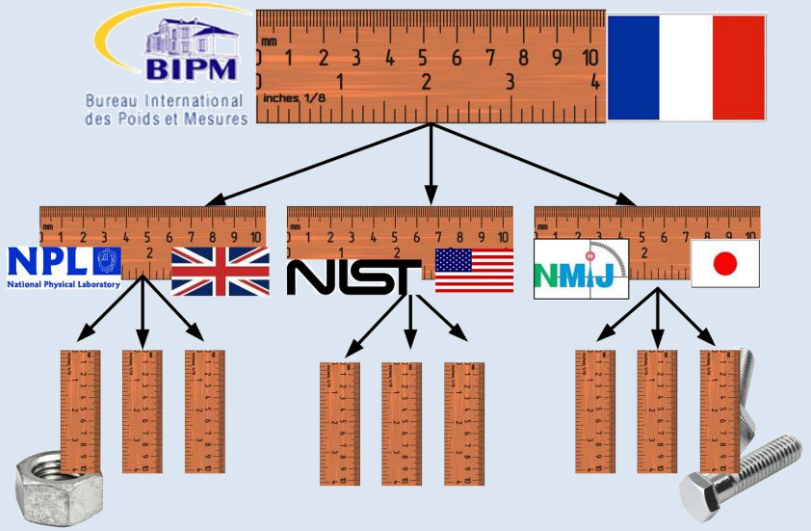
BASIC PRINCIPLES

- **one of the oldest human activities (Egyptian cubit etc.), dates 5000 years back – consistency of measurements**
- **protection of public interests in trade (protection of consumers) and other areas**
- **Caveat emptor (buyer beware): regulation should be applied only in case when consumers cannot protect themselves - this is e.g. the case of measuring instruments used in trade**

LEGAL METROLOGY

BASIC PRINCIPLES

- In all trade relations we need to compare measurements carried out at different times and locations – we need so called (metrological) traceability of measurement results
- WHY?



LEGAL METROLOGY

BASIC PROBLEMS

My 10 cubits of cloth purchased in Paris in year 1200 is suddenly reduced in length when I come with it to Brussels.

LEGAL METROLOGY

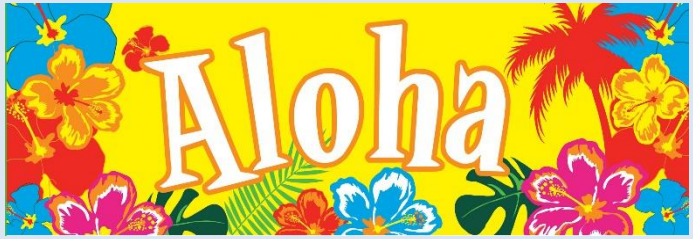
BASIC PROBLEMS

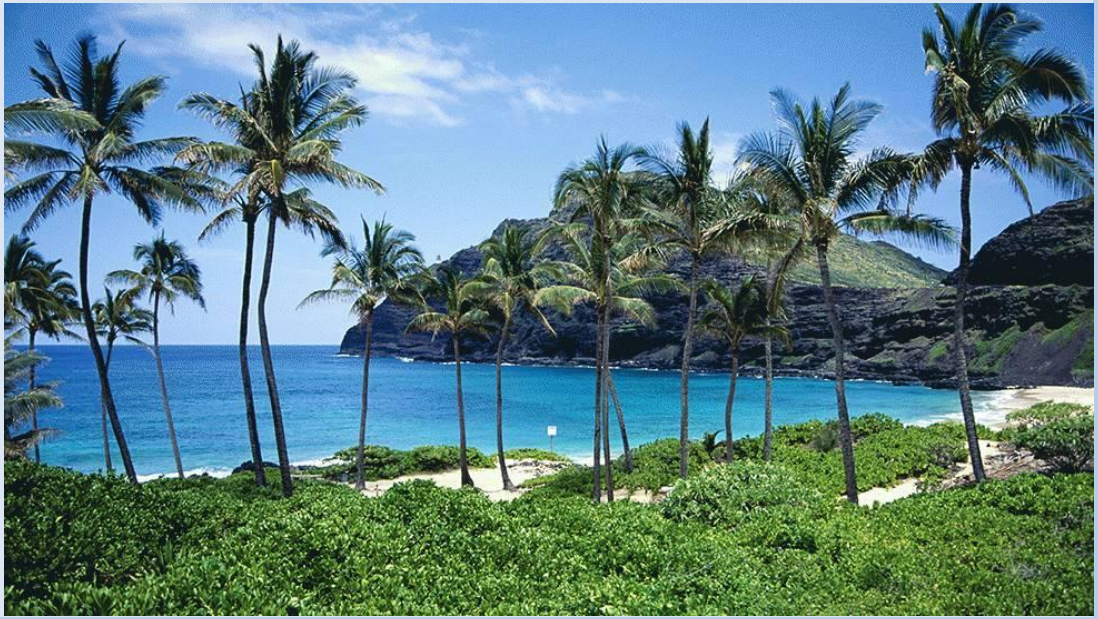
The mass fraction of protein 12.3 % in my wheat transported from Australia to the Middle East in year 2006 is suddenly changed to 11.9 % (and therefore, is of less value).

LEGAL METROLOGY

BASIC PROBLEMS

How can we conclude that the contents of CO2 in air is since 1950 in Hawaii continuously increasing with time when we are not sure whether we use the same units of measurement ?

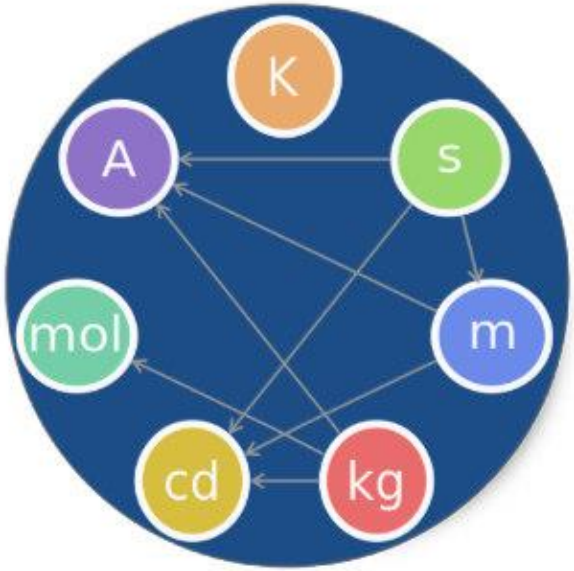




LEGAL METROLOGY

BASIC PRINCIPLES

- we need uniform and globally implemented system of units of measurement: their definitions and physical realizations – today **SI system of units** adopted in 1960



LEGAL METROLOGY

BASIC PRINCIPLES

- **(legal) metrology: sort of infrastructure invisible for citizens without which the global trade in goods and services would collapse**

LEGAL METROLOGY

BASIC PRINCIPLES

- nowadays citizens more and more aware of the importance of legal metrology (complaints)
- measurements are used in most trade transactions with the aim to ensure fairness to all parties, they must be able to be considered „acceptable“

LEGAL METROLOGY - today

Typical applications when regulation over measuring instruments (MIs) and measurements is used:

- protection of consumers in trade (fuel dispensers) and similar transactions
- measurements in health (blood pressure monitors)

LEGAL METROLOGY - today

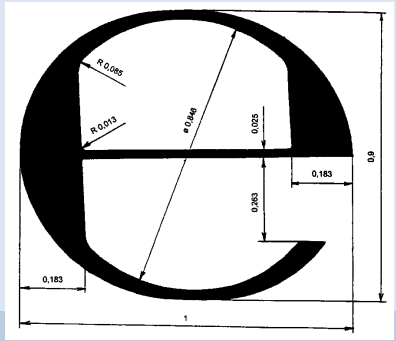
Typical applications when regulation over measuring instruments (MIs) and measurements is used:

- collection of taxes, fees, tariffs and fines (speedometers)
- protection of environment (quality of air and water)

LEGAL METROLOGY - controls

Typical control mechanisms nowadays used:

- pattern approval of MIs (EU Type examination)
- initial (EU verification) and subsequent verification of MIs
- testing of MIs within the validity of their verification periods
- control of prepackages (possibly also gaming machines)
- metrological supervision
- metrological expertise



LEGAL METROLOGY - controls

COMMENTS:

- **type approval: samples selected by manufacturers → possible negative influence of so called gold-plated MIs**
- **subsequent verification: historical development:**
  - **originally: to transfer the responsibilities to private bodies, authorized metrology centres**

LEGAL METROLOGY - controls

COMMENTS:

- **now:** partially the opposite development, back to **Government executive agencies** (Switzerland, Slovakia) – but only if they have enough of financial and organizational flexibility (no salary and staff cap) !

LEGAL METROLOGY - controls

What are the weak points in using competition (private bodies) in legal metrology ?

- attempts to manipulate the errors within (or even outside) maximum permissible errors (MPEs) in favour of the users of MIs (the benefits for e.g. fuel distributors are much higher than any reduction of fees due to competition) –

  a kind of soft fraud

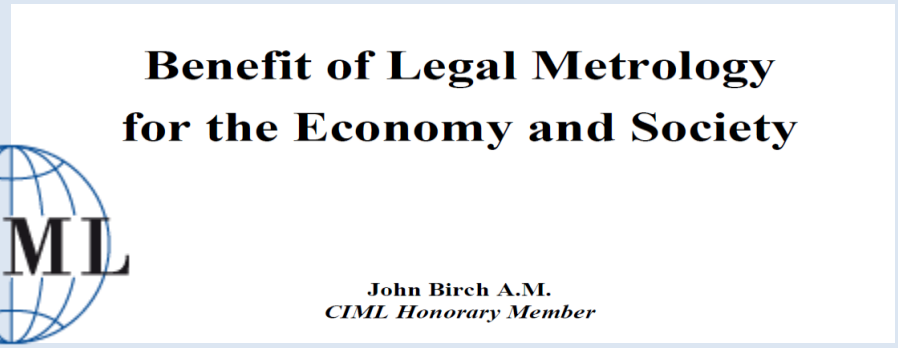
LEGAL METROLOGY - controls

What are the weak points in using competition (private bodies) in legal metrology ?

- under new approach EU legislation: a dangerous mix is formed when the repairer of e.g. fuel dispensers is at the same time a body authorized for their subsequent verification and the authorized representative of a manufacturer of the fuel dispensers, i.e. has all the information on their adjustments

LEGAL METROLOGY - impact

- **OIML: the Birch study https://www.oiml.org/en/files/pdf_e/e002-e03.pdf**
- **reduced disputation and transaction costs, level playing field for commerce, control of fraud**
- **USA: the value added from measurement related activities was 3.5% of GDP**



LEGAL METROLOGY - impact

- **CR: tighter limits for adjusting fuel dispensers introduced by CMI – benefit to consumers (citizens) of 500 mil. CZK annually which is 6x the subsidy to CMI from the state budget**
- **CR: testing of watermeters within the validity of verification on site – a direct benefit to citizens (see picture of the equipment used on the next slide)**

LEGAL METROLOGY - impact

LEGAL METROLOGY - controls

- originally the above mentioned controls applied only **on the national level**
- in recent years, a **higher-order structures** are arising to support trade in bigger areas by harmonization (elimination of technical barriers to trade), e.g. the EU

LEGAL METROLOGY - controls

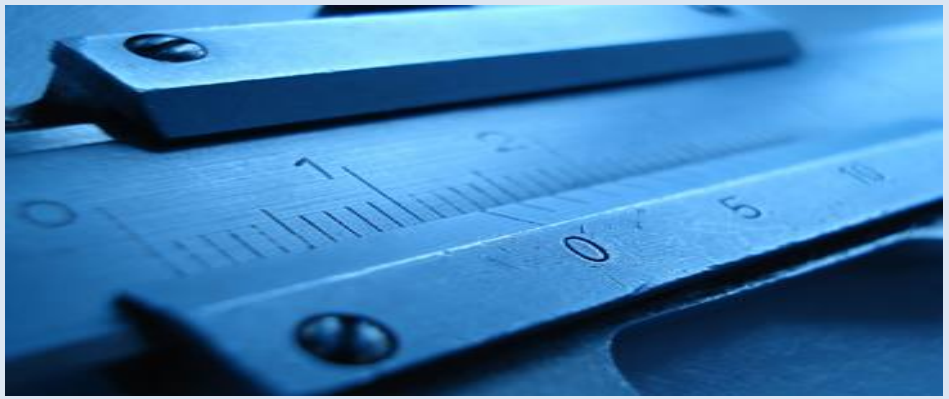
- **as a result, to form a single market, legislation (inclusive metrological) has to be split into 2 categories:**
  - **putting products (incl. MIs) on the market and into use – governed by European legislation → harmonized**
  - **metrological control over MIs in use (subsequent verification – periodical, after repair) - governed by national legislations → non-harmonized**

LEGAL METROLOGY - structure

- there is **no single system of legal metrology** all over the globe
- even in Europe, the approaches to national (non-harmonized) metrology infrastructure vastly different

LEGAL METROLOGY - structure

- **International Organization of Legal Metrology (OIML) – prepares recommendations and documents to promote harmonization of legal metrology in the world (the most important: D1 – Law on Metrology, D9, D16)**
- **www.oiml.org**



OIML

Organisation Internationale de Métrologie Légale

International Organization of Legal Metrology

LEGAL METROLOGY - structure

- **WELMEC (European Legal Metrology Cooperation) –**
  prepares various guidance documents for implementation of European directives in metrology – see www.welmec.org

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