

# NOISE AND STANDARDIZATION

focussing on machinery and  
workplace

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The single European  
market,

the « New Approach » ...

and NOISE

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## The « New Approach » in European regulation

- Birth date: 1985
- Background: free internal market within the EU
- Principle: free circulation of products with a high level of safety for their users

## New Approach directives and standards

- EU New Approach directives specify essential requirements to be fulfilled by products
- European Standards (EN) give technical specifications to fulfil the essential requirements
- The use by a manufacturer of a EN mandated under the Machinery Directive (**harmonized standard**) gives presumption of conformity to that directive

## EU directives relevant to machinery noise

- New Approach Directive 89/392/EC consolidated as 98/37/EC on machinery safety (all machines ; all hazards)
- Directive 2000/14/EC on **noise** from equipment used outdoors (57 families of machines)

## The philosophy of the Machinery Directive

- No limit values of noise emission
- Reduce noise at the design stage
- Allow comparison of noise emissions of machines on the market
- Allow market forces to play ... so that less noisy machines are put on the market and bought by users

## The Machinery Directive Essential Safety Requirements on noise

- « Reduce risks due to noise to the lowest possible level taking account of available measures to reduce noise, in particular at source »
- Provide information to users:
  - the A-weighted emission sound pressure level at the operator's position and, in some cases,
  - the A-weighted sound power level

Comité Européen de  
Normalisation

**CEN**




## Comité Européen de Normalisation CEN

- 276 active TCs, 100 SCs, 1500 WGs
- 1100 CEN documents adopted each year
- End March 2004:
  - 9570 published CEN documents
  - 5817 drafts

## Standardization in the field of machinery noise

A 3-layer cake: ISO & IEC  
CEN & CENELEC  
National  
Member Bodies

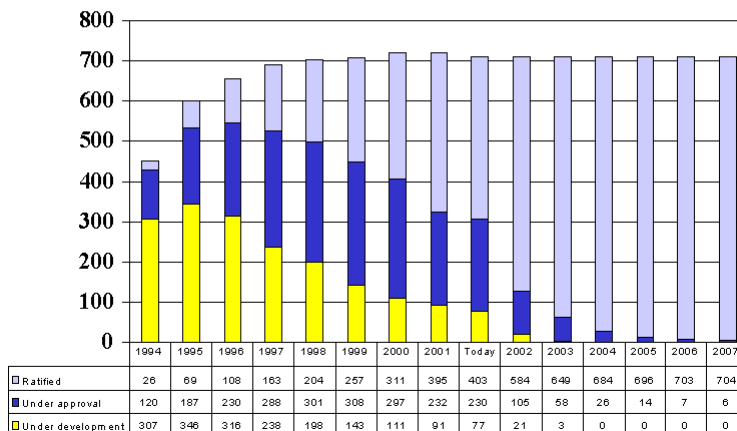


## Standardization in machinery noise

- ISO TC 43 Sub-Committee 1 « Noise » & CEN TC 211 « Acoustics »
  - SC 1/WG 28: basic standards on noise emission determination
- Many Technical Committees in CEN and ISO that draft **SAFETY STANDARDS** for machinery families
- National mirror commissions

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## 98/37/EC - Safety of Machinery



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## The machinery programme

end March 2004

- 460 published normative documents
- 312 drafts in progress

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November 1998

- 3 noise Consultants are introduced in the European scheme for controlling the quality of standards prepared in the frame of the « New Approach »

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## The Bibles for drafting good safety standards

- **EN ISO 12100 parts 1 & 2**: the mother standards for machinery safety
- **EN 414** on the drafting of safety standards
- **EN 1746** on the drafting of **noise clauses** of safety standards
- **EN ISO 12001** on the drafting of **noise test codes**

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## Noise in safety standards

- A clause on **noise reduction at the design stage**  
(**safety measures**)
  - A clause on **noise emission determination**  
referring to the relevant noise test code  
(**verification of safety measures**)
- A clause on **information on noise to be given to the user of the machine in the instructions handbook and the technical documentation**  
(**information on residual risk for the user**)

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## Main difficulties met (1)

- Reluctance of industry to deal transparently with a negative feature of products
- « Basic noise emission measurement standards are too many, too complex, too expensive »
- Hard task to specify operating conditions when drafting noise test codes: compromise between practicability, representativity and reproducibility

## Main difficulties met (2)

- How to determine noise emission prior to putting on the market machines assembled at the user's place?
- Measurement uncertainty as a technical and political issue

## Basic standards for noise emission measurement

**EN ISO** <sub>xywzt</sub>



## Basic standards on noise emission determination (1)

- **EN ISO 11200** series of **5 methods** to determine **the emission sound pressure level at operators' positions**
- **EN ISO 3740 (7 methods), 9614 (3 methods)** series on **sound power level**

## Basic standards on noise emission (2)

- EN ISO 11688 parts 1 & 2 on the design of low-noise machinery
- **EN ISO 4871** on the **declaration of noise emission from machinery**
- **EN ISO 11689** on the **use of noise emission values**

## Achievements

- For a wide range of machine families, safety standards:
  - make clear that noise reduction at source is essential
  - specify ad hoc measurement methods
  - specify the information to be provided to users
- Food processing machines
- Pumps
- Textile machines
- Foundry machines
- Industrial trucks
- Wood-working machines
- Compressors
- Hand-held tools
- Thermo-processing machines
- Shoe making machines
- ... and many others

## The « outdoor directive » 2000/14/EC

- A global directive...to become a New Approach one
- A-weighted sound power level only to be market on the machine
- Limit values for some of the 57 families of machines covered

## Some key and hot issues



- **Uncertainty**
- **Revising noise emission measurement standards**
- **Indicative values of noise emission**
- **Globalization**

## Uncertainty

- What do we know about the uncertainty of noise emission measurements?
- The GUM
- The challenge: a floating system

## Uncertainty

- **TECHNICAL:** what accuracy are we up to in acoustics?
- **ECONOMICAL:** do we have the financial resources to apply the GUM in acoustics?
- **LEGAL:** how to marry uncertainty and legal noise limits?
- **POLITICAL & SOCIAL:** who benefits from the uncertainty?

## Revising basic noise emission measurement standards

✓ A two-step revision

## Step 1: short-term revision in progress

- Committee Drafts for ISO 3741,  
3743-1,  
3744 and  
3747 :

ISO enquiry ends 2004-06-28

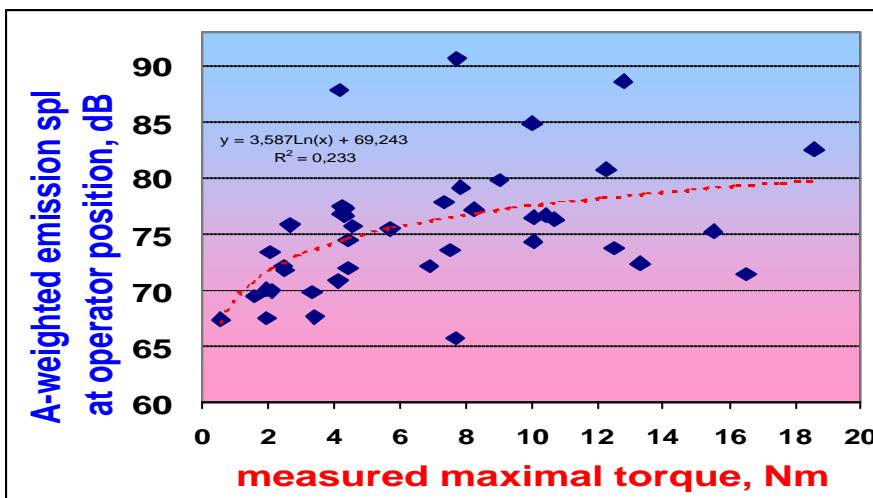
## Step 2: planned long-term revision

- Expectation:
  - a smaller number of standards
  - a floating system relating desired accuracy and measurement effort
- Research needed to face a real challenge

## Indicative values of noise emission

- How to use cleverly noise emission values made available by machine manufacturers through the noise declaration?

## The cloud strategy





## Globalization

- Is Europe going international?  
or *is America going European?!*
- Why not a worldwide « New Approach »?

## Noise at the workplace



## Means to reduce noise during propagation

- Enclosures and cabins
  - design: EN ISO 15667
  - acoustical performance: EN ISO 11546 parts 1 and 2  
EN ISO 11957
- Screens
  - acoustical performance: EN ISO 11821
- Silencers
  - design: EN ISO 14163
  - acoustical performance: EN ISO 7235, 11691, 11820

## Design of low-noise workplaces

- EN ISO 11690      Recommended practice
  - part 1: Noise control strategies
  - part 2: Noise control measures
  - part 3: Sound propagation and noise prediction in workrooms

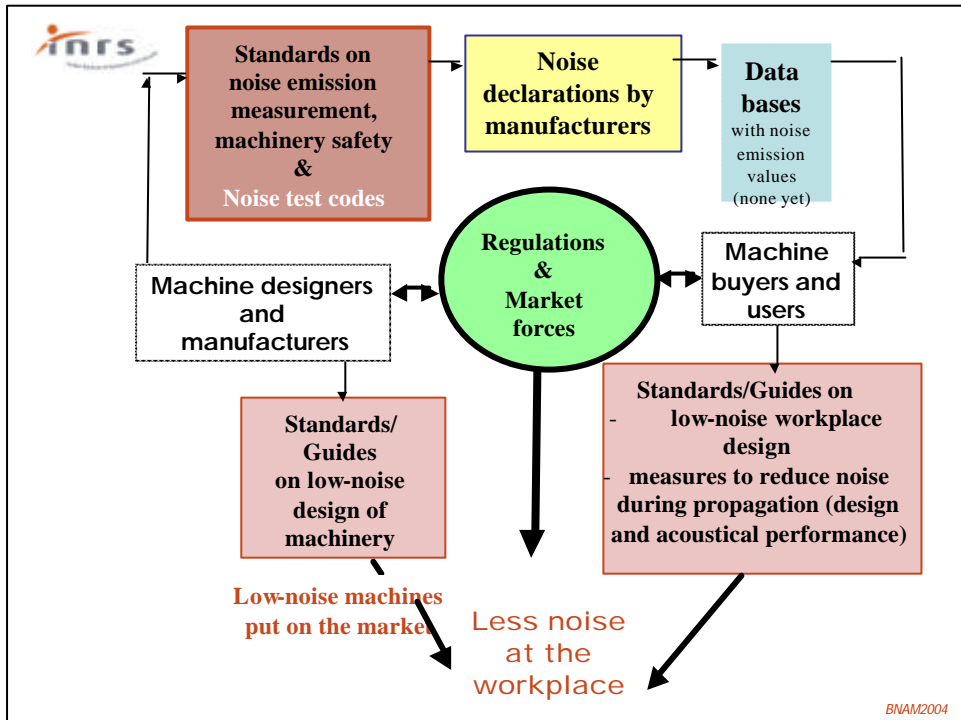
## Workplace acoustics

- EN ISO 14257

Measurement of spatial sound distribution curves in workrooms for evaluation of their acoustical performance

## Measurement of exposure to noise

- ISO 9612
  - An International standard that Europeans have rejected so far as a EN ... but maybe not for ever
  - revision in progress



**Conclusion**

- A comprehensive set of standards covering the full field of machinery and workplace noise is now available

...but work is not finished as standards are living documents that must be revised when technical progress is made and the state of the art changes

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