Status and trends in competent tester schemes - the Czech Republic

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situation

<table>
<thead>
<tr>
<th>airtightness requirements</th>
<th>test procedures</th>
</tr>
</thead>
<tbody>
<tr>
<td>• CSN 73 0540-2</td>
<td>• CSN EN 13829</td>
</tr>
<tr>
<td>• TNI 73 0329</td>
<td>• no official guidelines beyond CSN EN 13829</td>
</tr>
<tr>
<td>• TNI 73 0330</td>
<td>• sampling method for multifamily resid. buildings (TNI 73 0330)</td>
</tr>
<tr>
<td>• EP programme „Green savings“</td>
<td>• no official intention to control the reliability of test results</td>
</tr>
<tr>
<td></td>
<td>• no competent tester scheme</td>
</tr>
</tbody>
</table>

request for a quality guarantee x risk of incorrect practice

Jiří Novák | November 2013
Association Blower Door CZ (A.BD.CZ)

41 technicians
22 companies
2 companies accredited

- supervision and quality control of the professional activities of the members
- support of knowledge exchange and lifelong learning of the members
- development of measuring procedures and their implementation
- cooperation with state authorities

A.BD.CZ - control of tester competence

- members obligations:
  - observation of ethical code required
  - violations of ethical code = disciplinary procedure
  - observation of internal guidelines for test procedure...
  - mandatory participation to round-robin tests

- membership plays a role of a competent tester scheme...
ensuring reliability of test results

- airtightness testing in the framework of EP programme Green Savings (cooperating with state authorities)
- detailed guidelines specifying the test procedure beyond EN 13829
- common form of test report

round-robin tests

- comparison of test results given by:
  - different technicians
  - different measuring devices
  - under similar conditions
- control of the equipment...
- control of the technicians competence
- rough estimation of reproducibility of test results
- ... good mean to understand the source and nature of measurement errors
round-robin tests - equipment control

- leaky blower door panel

\[ V_{50,\text{panel}} \approx 35 \text{ m}^3/\text{h} \]

- standard single-family house: \( V \approx 400 \text{ m}^3 \)
- error in \( n_{50} \) due to panel leakage: \( \delta_{n50} \approx 0.09 \text{ h}^{-1} \)

round-robin tests - equipment control

- an error in test evaluation – probably a software error

1 accredited company (CSN EN ISO 17025) uses a measuring device with this sw!

(leads of accreditation process...)

\[ C \text{ and } n \text{ taken from test report} \]
round-robin tests - competence control

- influence of technicians' skills on the test results
- assumptions:
  - competence and skills grow with experience
  - experience grows in time and with the number of tests

- evaluation of test reports - lack of knowledge:
  - values out of physical limits (e.g. $n < 0.5$)
  - zero-flow $\Delta p$ limits exceeded
  - outlying points
**round-robin tests - results**

Measured air flow rate $V_{50}$ [m$^3$/h]:

<table>
<thead>
<tr>
<th></th>
<th>2010</th>
<th>2012</th>
</tr>
</thead>
<tbody>
<tr>
<td>min. value</td>
<td>231</td>
<td>254</td>
</tr>
<tr>
<td><strong>average value</strong></td>
<td>250</td>
<td>277</td>
</tr>
<tr>
<td>max. value</td>
<td>285</td>
<td>304</td>
</tr>
<tr>
<td><strong>standard deviation</strong></td>
<td>20</td>
<td>15</td>
</tr>
</tbody>
</table>

- Rough estimation of reproducibility: ± OK...
- Control of equipment: questionable
- Test results may be influenced by changing conditions
- Conditions are similar, but still changing...

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**lessons learnt**

- Common form of test report:
  - Easy check (can be automated)
  - Easy data collection (database)

- Control of equipment
  - Pressure gauges calibration—necessary but not sufficient
  - Other parts of measuring apparatus should be checked as well (including sw)
  - Influence of changing climatic conditions should be avoided (round robin in lab. conditions)
Lessons learnt

- control of technicians competence:
  - control of practical execution of a test (skills)
  - control of evaluation of measured data

Quality control scheme

- certification of persons (technicians)
- certification body – A.BD.CZ + independent third party
  - the third party examines the competence of the applicant
  - A.BD.CZ confers its certificate ("mark") to the successful applicant
- the validity of the certificate will be limited in time (recertification necessary)
- the third party – VÚPS Certifikační společnost s.r.o.:
  - accredited certification body
  - accredited laboratory – airtightness testing of building components
quality control scheme

• 1st certification:
  – evaluation of test reports
  – examination – theoretical background
  – examination – practical competence
  – proof of equipment calibration

• recertification:
  – evaluation of test reports
  – examination – practical competence (random control at building site)
  – participation to the round-robin test (in a laboratory facility?)
  – proof of equipment calibration

quality control scheme

• other obligations (the same as the A.BD.CZ membership):
  – observation of ethical code
  – observation of test procedure guidelines
  – use of the common test report form
  – supply the test results to a database
conclusions

• consistent quality of testing practice and reliable results need:
  − well defined rules - test procedures
  − control of compliance with the rules – a competent tester scheme
• the competent tester scheme proposal:
  − provides with detailed guidelines
  − covers the important aspects of quality control (equipment, practical skills, knowledge, follow up, ...)
• barriers to its implementation:
  − it is an ambitious project...
  − its credibility is not guaranteed by state authorities...
  − how to convince the market that it represents real quality?
  − no training programme...

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thank you for your attention...

...questions?

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