HAND TOOLS' CREATED HAND - ARM VIBRATION LEVELS EVALUATION IN LATVIAN WORK ENVIRONMENT

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EIROPAS REĢIONĀLĀS ATTĪSTĪBAS FONDS

IEGULDĪJUMS TAVĀ NĀKOTNĒ

EIROPAS SAVIENĪBA

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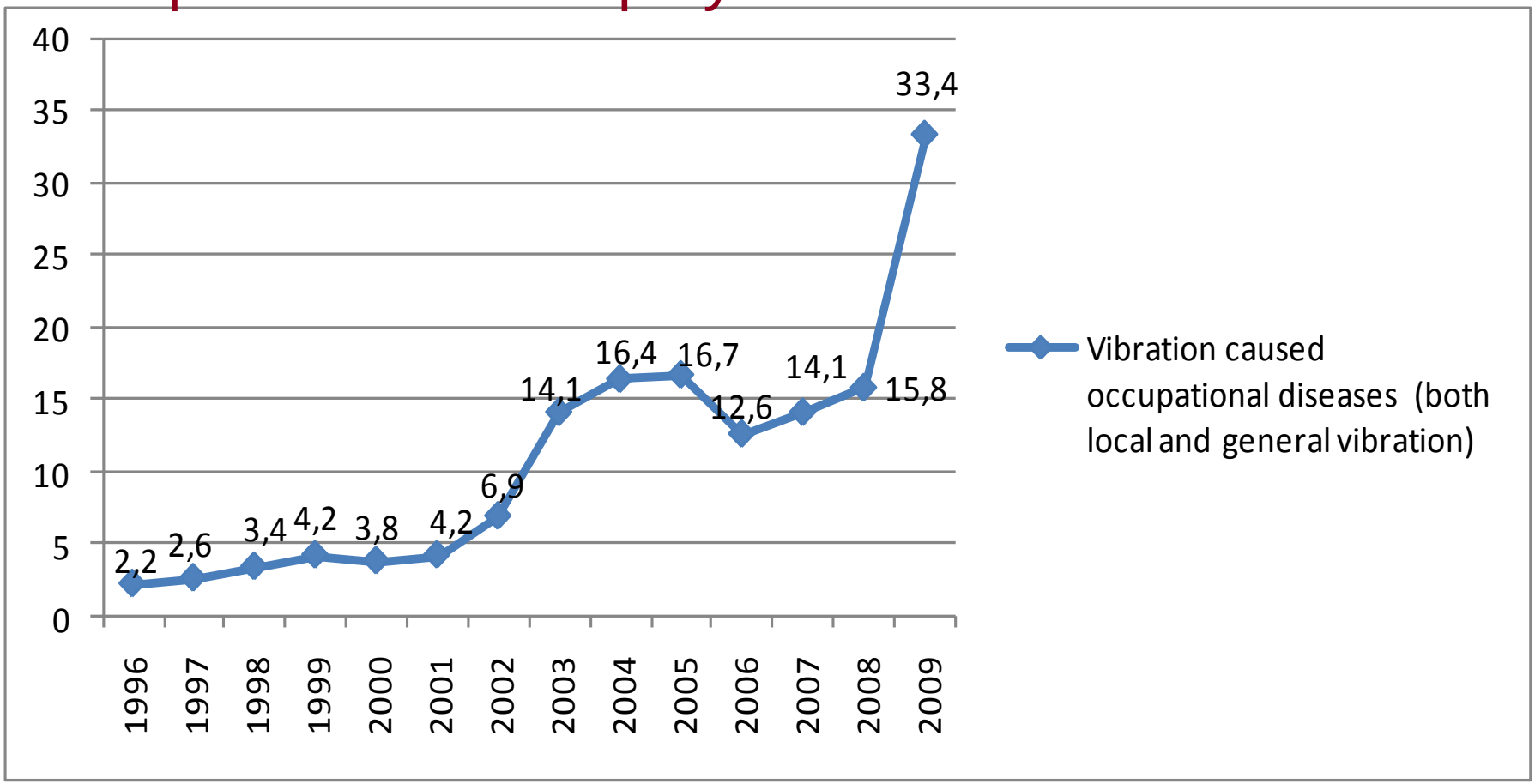
Vibration in work environment

- Hand - arm vibration is transmitted through the hands of employees by the equipment, which is characterized with beats and rotation.
- Vibration is one of the most important risk factor in sectors such as forestry, woodworking, metal industry, machinery repair, construction, etc.
- Regular and frequent exposure to hand-arm vibration can lead to permanent health effects.

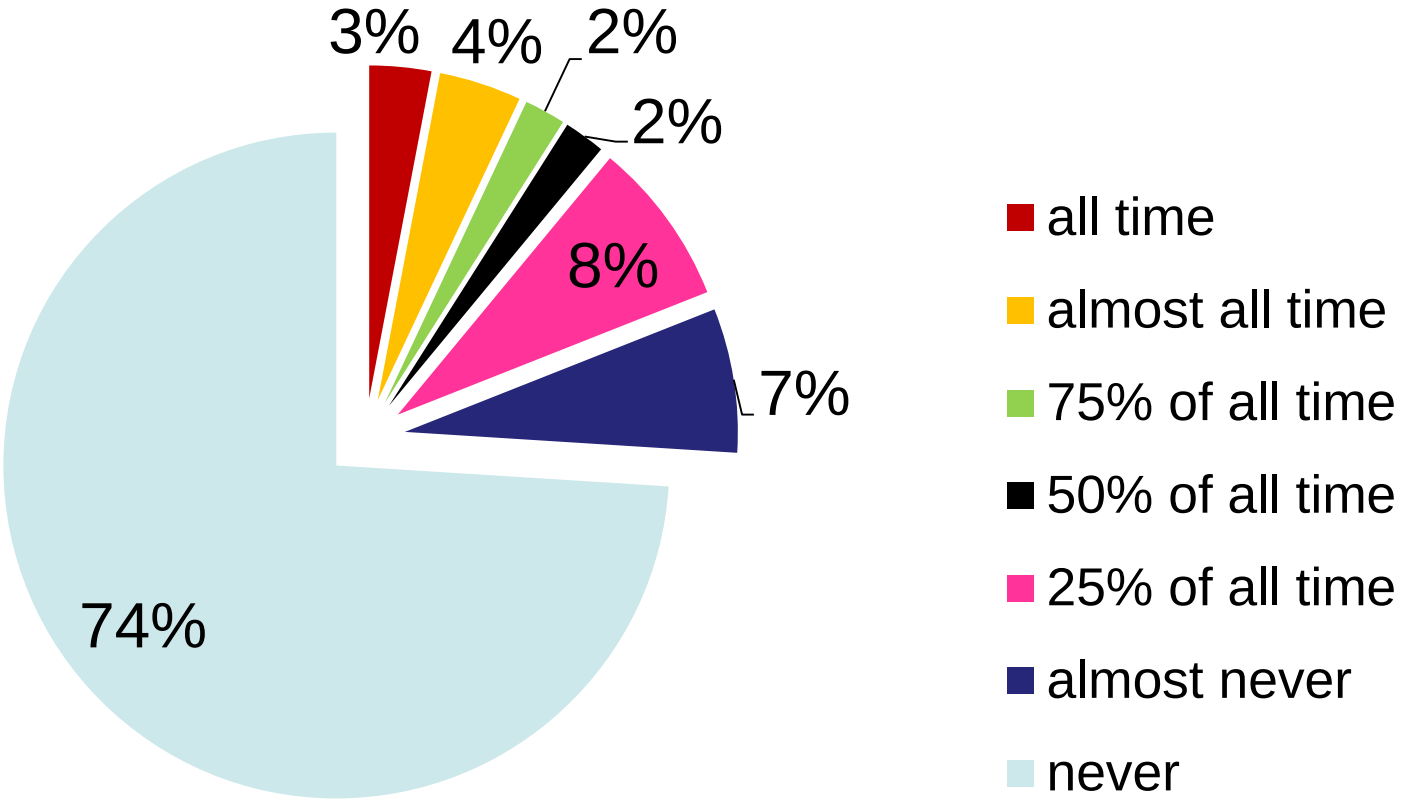
- Hand - arm vibration causes "white finger" syndrome, which is the most common problem of employees who works with vibrating hand tools.
- Vibration diseases usually are diagnosed after 5 to 15 years after vibration impact, so the diseases increase in the majority cases can not be attributed to risk factor exposure at the moment, but several years ago.
- In order to avoid occupational diseases employers need to provide risk assessments and laboratory measurements.

Vibration caused occupational diseases (both local and whole body vibration disease) from 1996 to 2009 per 100 000 employees.



- data of Pauls Stradins Clinical University Hospital Center of Occupational and Radiological Medicine.

Distribution of workers after exposure to hand-arm vibration



- Data from "Work conditions and risks in Latvia 2009-2010"

Aim of the work

- to describe the most frequently used hand tools hand - arm vibration levels, depending on the tools type.

Materials and methods

- Measurements database of Laboratory of Hygiene and Occupational Diseases.
- During the period from 2007 to 2010 were made 1195 hand-arm vibration measurements, of those 55,5% (n = 660) were hand tools measurements.
- The vibrations levels exposure was assessed by using calibrated Bruel & Kjaer human vibration analyzer Type-4447.

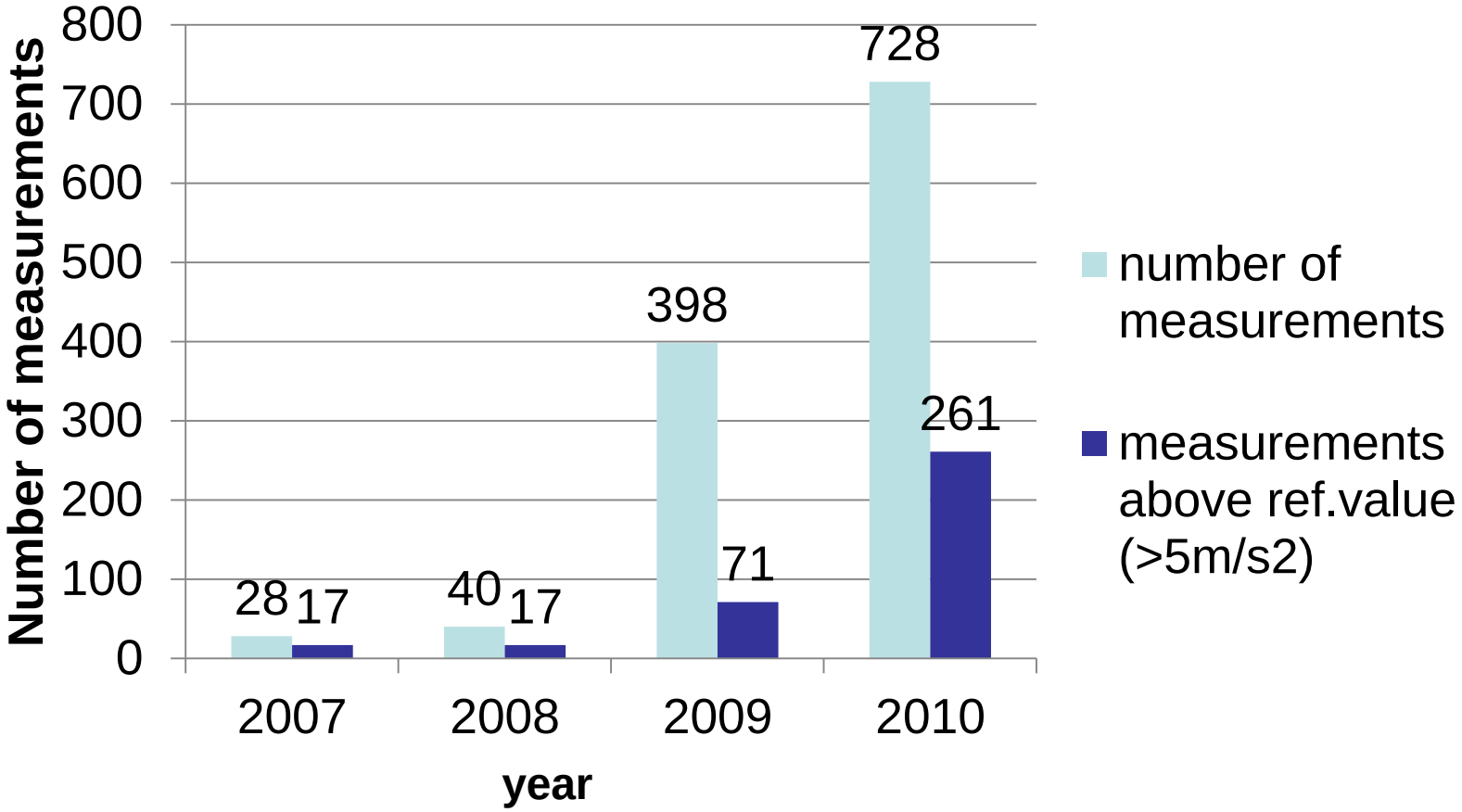
Hand- arm vibration level measurement methods

- LVS EN ISO 5349/1:2005L Mechanical vibration -- Measurement and evaluation of human exposure to hand-transmitted vibration -- Part 1: General requirements.
- LVS EN ISO 5349/2:2005L Mechanical vibration -- Measurement and evaluation of human exposure to hand-transmitted vibration -- Part 2: Practical guidance for measurement at the workplace

Limits in Latvia

- Vibration levels limits are compared with Latvian Cabinet of Ministers law number 284 "Labour Protection Requirements for the Protection of Employees from the Risk Caused by Vibration in the Work Environment
  - Hand-arm vibration threshold in the work environment in Latvia is 5m/s^2.

Number of hand- arm vibration measurements and levels from 2007- 2010

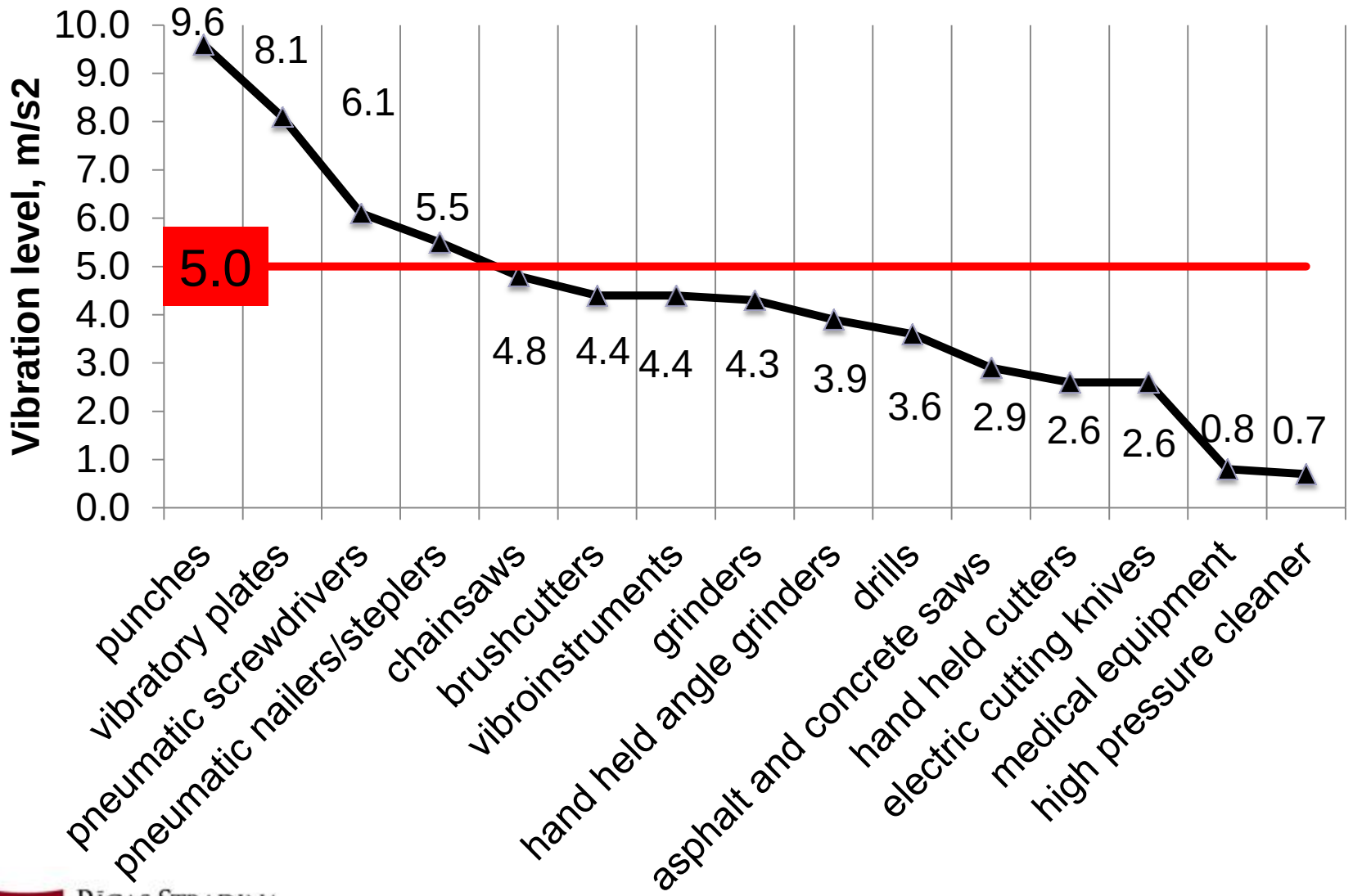


Results

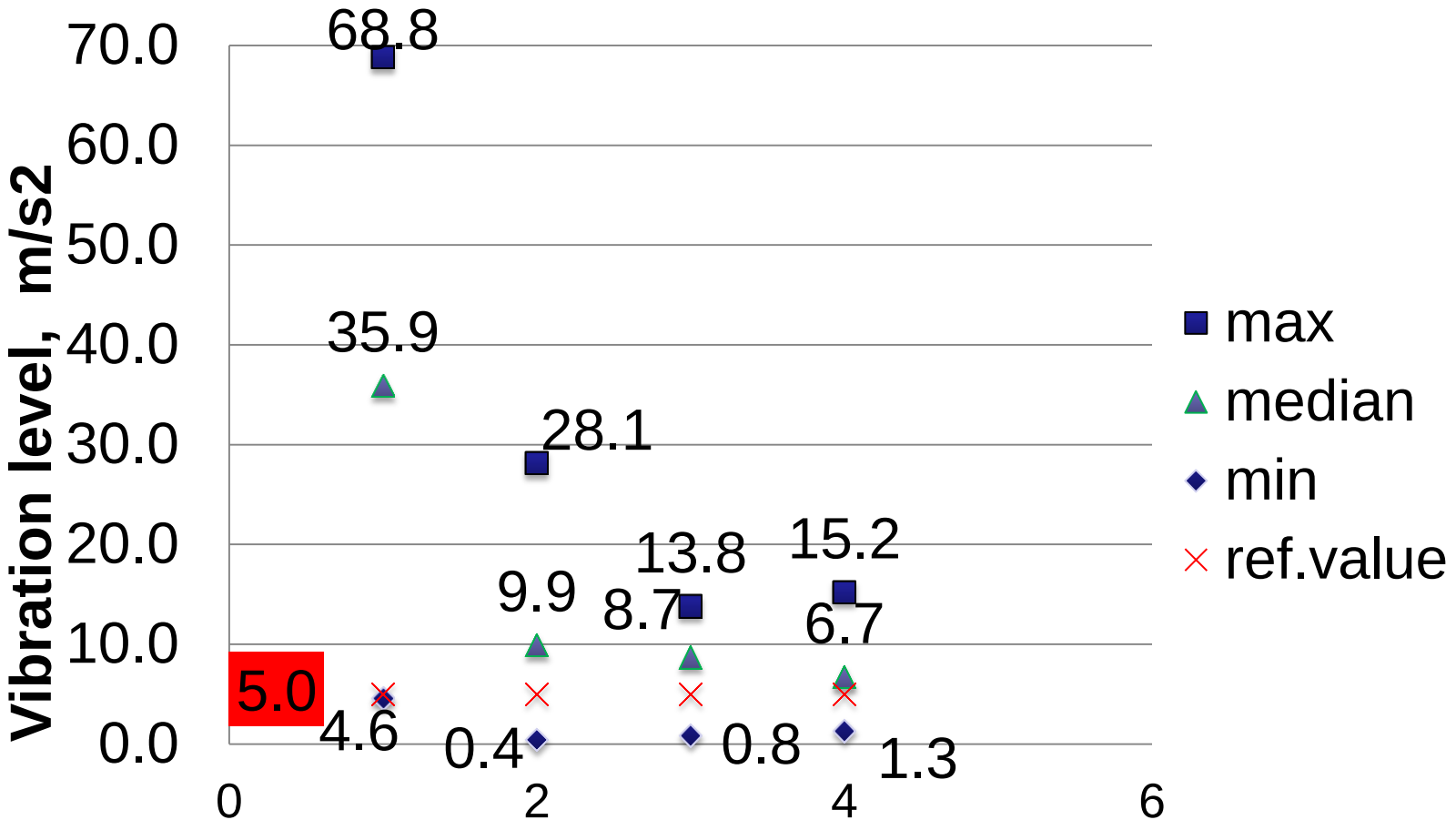
- 10 most commonly used and measured hand tools in different sectors are:

1. grinders 24.2 % (n = 160)
2. punches/ demolition hammers 13,7 % (n = 90)
3. vibratory plates / rammers 12,0% (n = 79)
4. hand-held angle grinders 10,3% (n = 68)
5. pneumatic screwdrivers 6,8% (n = 45)
6. asphalt and concrete saws 6,2% (n = 41)
7. chainsaws 6,2% (n = 41)
8. drills 5,0% (n = 33)
9. brushcutters (including trimmers, lawn mowers) 4,5% (n = 30)
10. pneumatic nailers and pneumatic staplers 3,3% (n = 22)

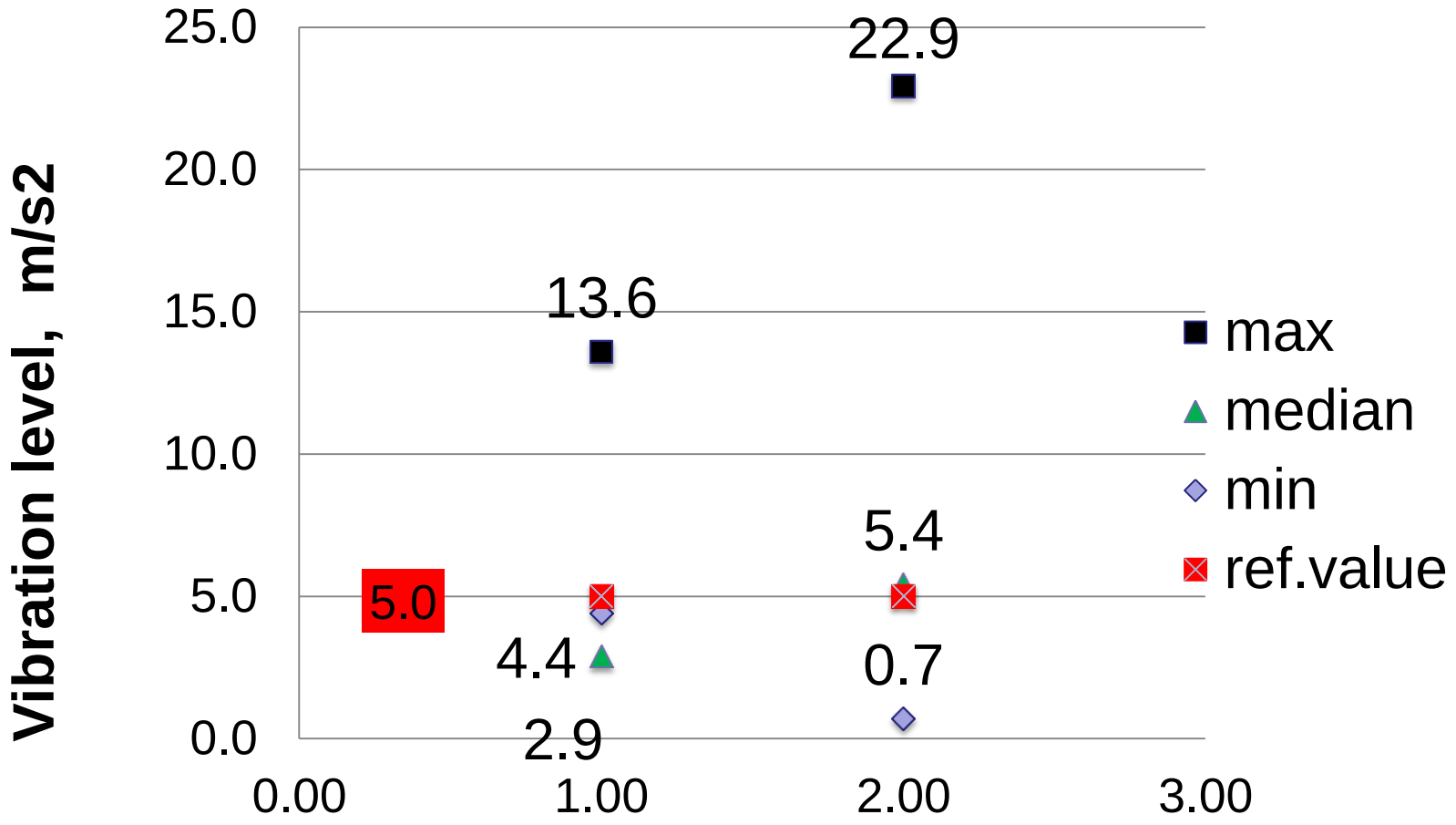
Most commonly used and measured hand tools median vibration levels



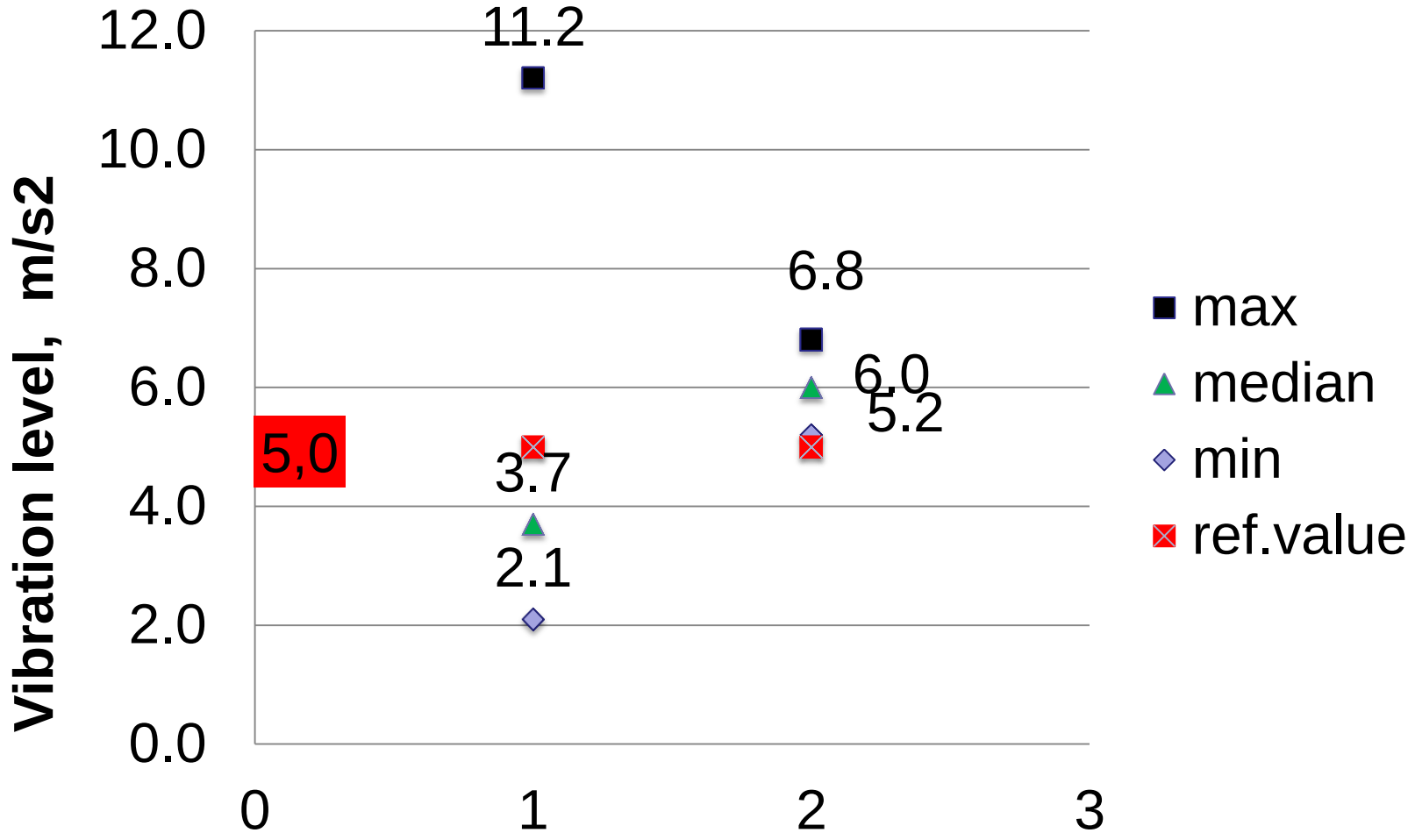
Punches/ demolition hammers vibration levels



Grinder vibration levels depending on work material (2008. - 2010. year)



Drill vibration levels depending on work material (2008. - 2010. year)



Conclusion

- Vibration levels depend on work material, instrument technical condition, nature of the work, employee individual experience and employees attitude.
- The largest hand arm vibrations are from demolition hammers, vibratory plates, pneumatic screwdrivers, pneumatic nailers and pneumatic staplers. These are typical instruments in construction and road upgrading.

Thank you for your attention!