HAND ARM VIBRATION

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Daily Exposure to Hand-Arm Vibration of Technicians in Wastewater Treatment Plants and After-Sales Service

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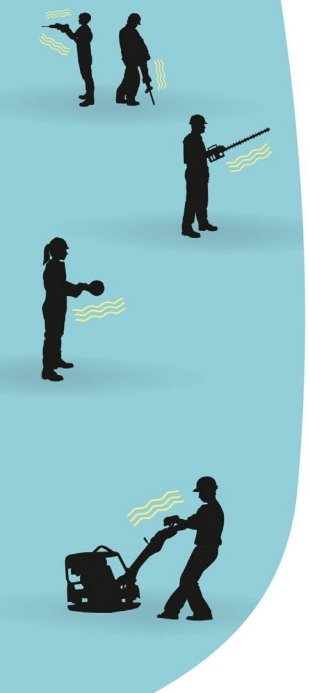
SUMMARY



- Introduction
- Method

  including contain of the awareness workshop

“ HAND-ARM VIBRATION - the hand and the arm in danger “

- Results
- Conclusion

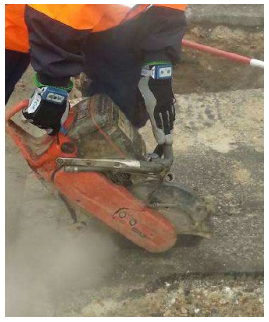
Introduction

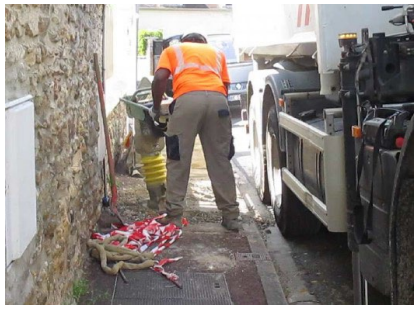
We work in an association ACMS Pour la santé au travail which is an french inter-company health at work and prevention service. Our teams provide globally :

- individual health monitoring of one million employees working in Paris region
- support member companies in their prevention efforts at their 80 000 working places (remark: 95% of these companies have less than 50 employees), acting in all business areas (trade, business services, catering, health and social services, industry, real estate, transport, logistics, …)

In this study, we focuse on the daily exposure to Hand arm vibration of :

- technicians in a after-sales service of a company supplying a wide range of portable tools for professionnals and the general public,  
- maintenance technicians and operating agents in wastewater treatment plants and network technicians on the water distribution network

Method

- Establish a precise inventory of the tools used by the employees in a table
- Complete with the vibration level (provided by the supplier) and the duration (hours & minuts) of use per day of each tool (questioning the employees and the team leaders)

Remark: with After sales Technicians, we request also duration for testing tools

- Use « Hand arm vibration calculator » INRS tool using vibration level given by supplier of tools for calculation of Hand-Arm daily vibration exposure A(8)

	Model	Designation of portable tool	Vibration level (m/s2)	Duration of one test of the portable tool (sec)	Activity area	Percussive or vibrating tool	Duration of daily exposure (hour)	Duration of daily exposure (minutes)	Hand-arm daily vibration exposure A(8) m/s2	Duration of vibration exposure pour action value (2.5 m/s2)	Duration of vibration exposure for limit action (5 m/s2)	Number of tests for limit value (5m/s2)
	....	Circular saw	1.5	20	Metal ou wood cutting	Vibrative	1	0	0.5	>8h	>8h	>100
	.....	Rotary hammer	12.5	120	Construction works	Percussive	1	0	4.4	0h19	1h17	39

Method

- Elaborate an awareness workshop « the hand and the arm in danger »

Pedagogic scenario part 1

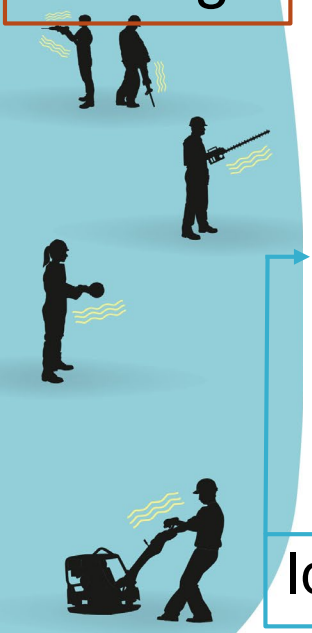
Objective and Introduction

Title of the awareness workshop: HAND-ARM VIBRATION - the hand and the arm in danger

Objective : (2020) Raise awareness technicians involved by regular and frequent use of percussive and vibrating portable tools.

References	Sequence of presentation / Objectives / Key points	Action of animator	Actions of players
Presentation of C Noël (INRS) "Vibrations Mains Bras de l'exposition aux effets" (04/2019) + Documents INRS ED 6204 (10/2016) and ED 6342 (10/2019) + CRAMIF DTE 271 (03/2017) + tool INRS OSEV MB (10/2018)	Introduce the workshop, mentioning the procedure according to the ED 6204 flyer, the use of the OSEV Hands and Arms evaluation tool. Use slides n°1 to 6 of Presentation of C Noël and part n°1 of ED 6204.	Presentation by the animator	Explanations on employee's job
Presentation C Noël (INRS) slides 7 et 8 and ED 6204 part n° 2 "Douleur et gêne ..."	Comments on the 2 slides and the page in part 2. Vibration syndrom leads to damage to the upper limbs (fingers, hands, elbow, shoulder), bones, muscles and tendons.	Explanations of health damage due to vibration Hands Arms	Potential evocation of alteration experienced from the employees who use vibrating tools.
ED 6204 part n° 3 "Identify risk situations", List of portable tools used in the company (list to be drawn up with the company when preparing the workshop). Example of Data sheet for one portable tool provided by its supplier.	Comment on the page in part 3 "Identify risk situations." Show examples of data sheets for portable tools where the vibration levels are given according to the test code	Discuss with the employee and find out which vibrating tool(s) he uses, choose with him one of the tools to evaluate the exposure with the OSEV Hands and Arms table.	Specifications of the employee's vibration-exposing activities, with the hand-held tool(s) he/she uses from the list of tools
Tool INRS OSEV HAND-ARM	Evaluate the employee's exposure with the vibrating tool he use most frequently	Use the OVEV Hand Arm tool, select the tool agreed with the employee, have the employee choose the different conditions of use that OSEV proposes, the exposure time, comment on the result of the assessment from OSEV, in particular the value of the A(8) in relation to the regulatory thresholds	Choice of the conditions of use of the tool among those proposed by OSEV tool (including the duration of use per day)

Damage



Identify risk situations

Evaluate employee exposure

Method

- Elaborate an awareness workshop « the hand and the arm in danger »

Pedagogic scenario Part 2

Reduce level of vibration

Limit duration of exposure

Reduce contraints

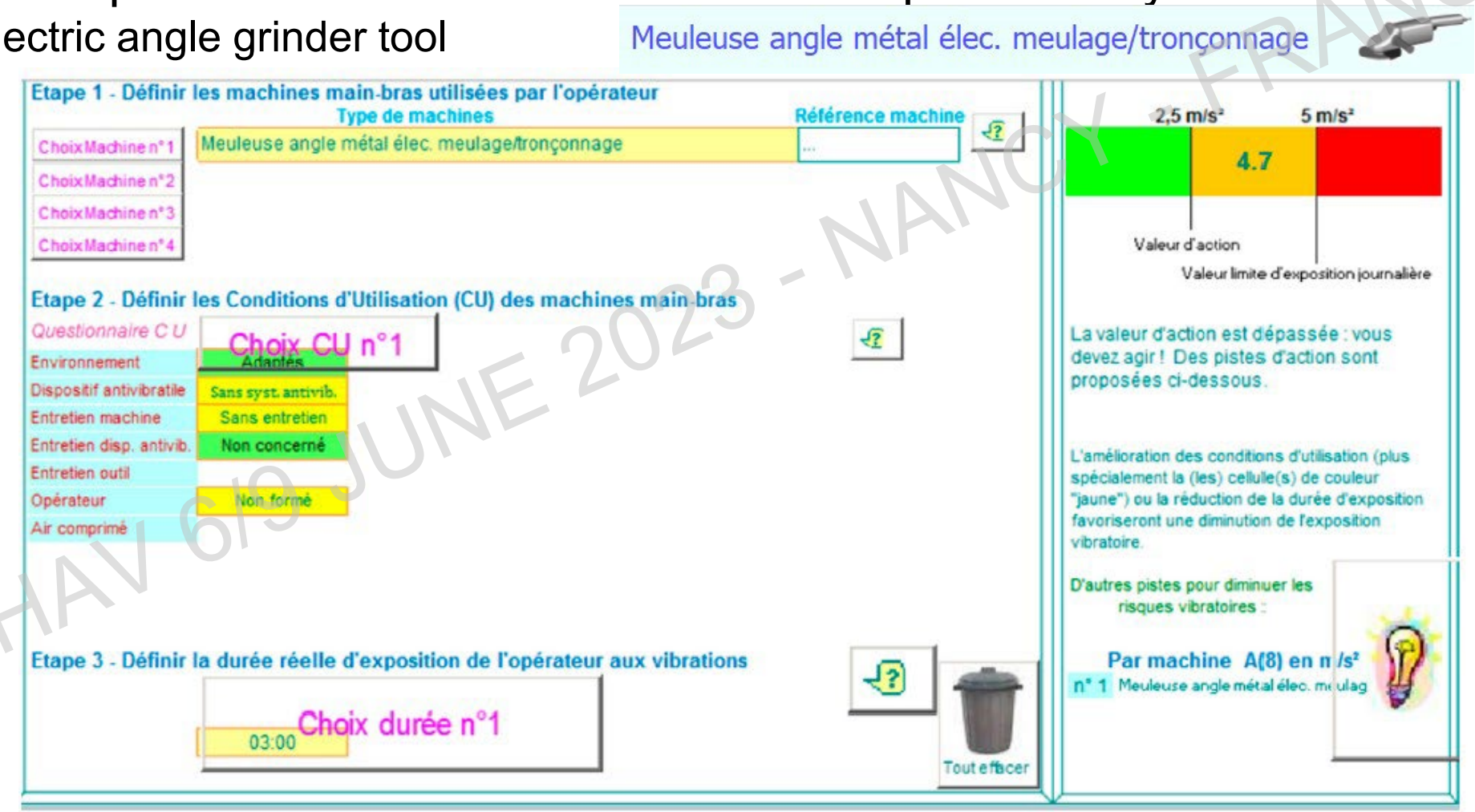
Inform employee

References	Sequence of presentation / Objectives / Key points	Action of animator	Actions of players
ED 6204 part n° 4 "Reduce level of vibrations" + DTE 271 CRAMIF "Choosing the right hand tool for the right job"	Comment on the 3 points mentioned in part 4 "Reducing the level of vibration" with examples: - Change work methods: replace a jackhammer with a mini-excavator equipped with an excavator. - Choose less vibrating machines or tools: compare the vibration levels announced by the manufacturers, before buying new tools, look for tools equipped with anti-vibration devices. Show the summary of the CRAMIF DTE 271 document, and the selection aid grid in chapter 5. - Maintain tools in good condition: have tools checked regularly, some accessories are wearing parts, changing them will ensure that the same level of vibration is obtained as with the new tool.	Inform the employee about the approach to reduce vibrations, to choose a portable tool for better work.	Listening and understanding the advices
ED 6204 part n° 5 "Limit the duration of exposure" + outil OSEV MB	Comment on the 2 points mentioned in part 5 "Limit the duration of exposure: - Provide for job rotation (shift work, etc.) - Arrange recovery time (alternate work phases exposed to vibrations with non-exposed phases, to allow good blood circulation in the hands, etc.) Using the OSEV tool, re-evaluate the employee's exposure with his or her vibrating tool by reducing the exposure time by two, and comment on the result.	Inform the employee on how to limit the duration of exposure by changing the organisation of the work.	Listening and understanding the advices
ED 6204 part n° 6 "Reduce the constraints ..."	Comment on the 3 points mentioned in part 6 "Reducing stress". In particular, insist on the limited impact of wearing anti-vibration gloves. They keep warm and dry the hands, their effectiveness in reducing vibrations varies according to the tool used. On their own, they are not a sufficient solution.	Inform the employee on how to reduce the strain on the hand and arm.	Listening, exchanges with the animator, and understanding the advices
ED 6204 part n° 7 "inform and train employees"	As a conclusion to this workshop, quote and comment on the various points mentioned in part 7 "Inform and train employees". Reiterate the objective of this workshop, recall the result of the assessment of the employee's exposure to vibration obtained with OSEV, a result that can be made available to him if he so wishes at a later date (via a screen capture in the OSEB tool and communication to the occupational physician). Comment on the "Medical surveillance" box in ED 6204 . Mention the interest for the employer and the persons responsible for occupational risk prevention of the document ED 6342 "Guide to good practice" published by the INRS.	Conclude the workshop with the employee, recalling the objective, the result of the assessment carried out with OSEV MB, and the nature of the possible measures to eliminate or reduce the risks resulting from Hand Arm vibration.	Listening, exchanges with the animator

Method

- Create a report with results of the Hand-Arm OSEV tool based on information provided by the employees who participate to the workshop

Below an example: OSEV result with informations provided by network technician, his use of electric angle grinder tool



Results

For technicians in a after-sales service of a company supplying a wide range of portable tools for professionnals and the general public,

262 different tools (Percussive and vibrating) marketed with 3 Trademarks by the supplier company were referenced in the inventory table.

Trademark	Number of listed tools	Sector of activity
Trademark 1	57	Construction, metals, wood and green spaces
Trademark 2	59	Construction, wood, cardboard
Trademark 3	146	Car and trucks
Total	262	

Results

Study HA vibration exposure of technicians in a after-sales service

- With tools of Trademark 1 (sectors: construction, metals, wood and green spaces)

Trademark 1 Hand Arm Daily Vibration exposure A(8) m/s^2 (for 1 h of exposure)	Number of tools	Number of tests for Limit Value ($5m/s^2$)	Comments according a « usual daily activity » with 10 thru 12 repaired tools per After-Sales technician
<2.5m/s2	40		A(8) lower than Action value
> $2.5m/s^2$ (Action value)	14	between 32 and 346 tests	A(8) lower than Limit value
>$5m/s^2$ (Limit value)	3	27,29 et 70 tests	A(8) upper than Limit value, Need attention

On hammer drill, perforator

- With tools of Trademark 2 (sectors: construction, wood, cardboard)

Trademark 2 Hand Arm Daily Vibration exposure A(8) m/s^2 (for 1 h of exposure)	Number of tools	Number of tests for Limit Value ($5m/s^2$)	Comments according a « usual daily activity » with 10 thru 12 repaired tools per After-Sales technician
<2.5m/s2	57		A(8) lower than Action value
> $2.5m/s^2$ (Action value)	1	46 tests	A(8) Lower than Limit value
>$5m/s^2$ (Limit value)	1	55 tests	A(8) upper than Limit value, Need attention

On nailing machine

Results Study HA vibration exposure of technicians in a after-sales service (more)

- With tools of Trademark 3 (sectors: Car and trucks)

Trademark 3 Hand Arm Daily Vibration exposure A(8) m/s^2 (for 1 h of exposure)	Number of tools	Number of tests for Limit Value ($5m/s^2$)	Comments according a « usual daily activity » with 10 thru 12 repaired tools per After-Sales technician
<2.5m/s2	103		A(8) lower than Action value
> $2.5m/s^2$ (Action value)	31	From 22 to 116 tests	A(8) Lower than Limit value
>$5m/s^2$ (Limit value)	12	55 tests	A(8) upper than Limit value, Need attention

On impact spanner, vibrating sender

Results For maintenance technicians and operating agents in wastewater treatment plants and network technicians on the water distribution network

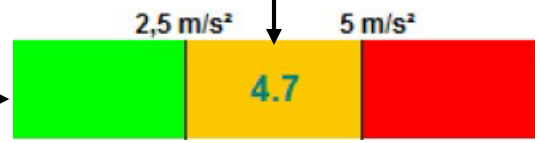
5 different tools (Percussive and vibrating) are mostly mentioned by employees:

- Electric angle grinder tool
- Metal drill
- Saber saw
- Tamping rammer
- Brush cutter

Daily exposure to Hand-Arm vibration for **maintenance technicians** working on large sites

HA OSEV **A(8)**

- 3 hours by day using **Electric angle grinder tool**



- 3 hours by day using **metal drill**

Results

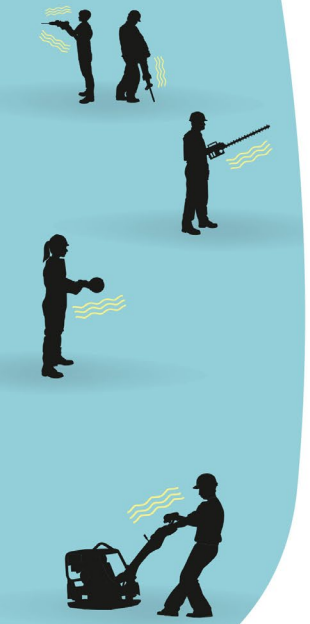
For maintenance technicians and operating agents in wastewater treatment plants and network technicians on the water distribution network

Daily exposure to Hand-Arm vibration for **operating agents** working on plants

HA OSEV **A(8)**

- 1 hour by day using **Electric angle grinder tool**

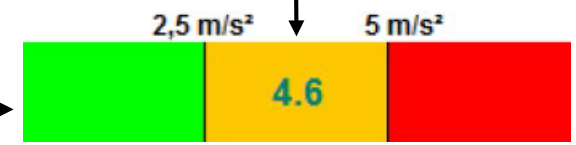
- 2 hours by day using **Brush cutter**



Daily exposure to Hand-Arm vibration for **network technicians** working on water distribution sites

HA OSEV **A(8)**

- 30 minuts by day using **Saber saw**



- 2 hours by day using **Tamping rammer**

Conclusion

For the two cases studied, our recommendations concern the three axis

Reduce level of vibration:

- When purchasing new equipment, choose the least vibrating machines, tools and equipment according to the data (including vibration level) provided by the manufacturers.
- Maintain equipment in good condition

Limit duration of exposure:

- Provide for job rotation and multi-skilling
- Arrange for recovery time

Reduce contraints:

- Choose the equipment best suited to the tasks to be carried out
- Train operators in the use of the equipment to be used- Use clothing appropriate to the work environment to keep the body and hands warm and dry
- Organise work areas to improve postures, to reduce pushing and gripping efforts

Thanks for your attention

Any questions ?