WOOD DUST GOOD PRACTICES TO REDUCE EXPOSURE

Roadmap on carcinogens
FOD WASO – BSOH
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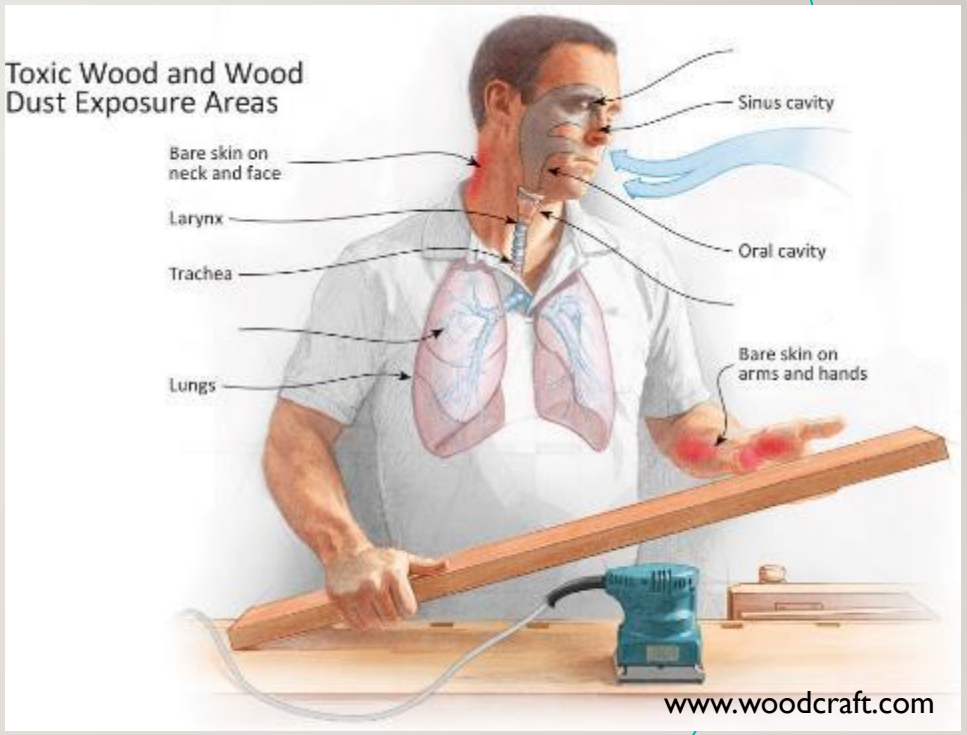
AGENDA

- Wood dust & health risks
- Legislation in Belgium & some other countries
- Risk analysis: where is dust released - measurements
- Dust extraction
- Good cleaning and removal practices
- Personal protection
- Informing & raising awareness

WOOD DUST & HEALTH RISKS

- Breath:
  - Irritation, allergic reaction (asthma), inflammation of pulmonary alveoli
- Skin: irritation, sometimes eczema, inflammation (splinter)
  - Tropical species
- Cancer: sinus cancer
  - ¾ in wood sector, 1000 x higher than other population



WOOD DUST - COMPOSITION

- **Type of wood (tree species)**
  - botanical (plant families) / origin (species) -> chemical composition
  - Names of traded timber species according to appearance or 'common name' !
    - E.g.: Palissander, Acacia (=Robinia)
- **Size : < 0,5 mm = dust, larger = chips / shavings**
  - **Fine** dust, e.g.. from sanding and fine fraction from processing
  - **Coarser** dust, e.g., from sawing and miling operations
- Humidity: dry – wet
- Boards: adhesives, auxiliary materials, ...
  - E.g., MDF, …

HARDWOOD VS SOFTWOOD

Durabil. Class 3-5

Hard-wood

Deciduous

Angiosperms

Balsa

Western Red Cedar

Poplar

Birch

Willow

Gymnosperms

Coniferous

Soft-Wood

Durabil. Class 1-2

800 species

Tropical

Thermo-wood ?

11 000 species

GROUPS WOOD DUST – HEALTH

WOODWIZE
nooit op eigen houtje

BESLISSINGSBOOM
HOUTSTOF

Risicogroep 1: loofhout – tropisch hout – behandeld plaatmateriaal (melamine, volkern, water- en vuurbestendige chemicaliën, ...)

Risicogroep 2: naaldhout met uitzondering van red wood cedar – onbehandeld plaatmateriaal (formaldehyde-arm)

ARBRE DE DÉCISION POUR LA
POUSSIÈRE DE BOIS

Groupe à risque 2 : bois feuillus - bois tropicaux - panneaux traités (mélamine, âme pleine, produits chimiques résistant à l'eau et au feu, etc.)

Groupe à risque 2 : bois résineux, sauf le cèdre rouge - panneaux non traités (à faible teneur en formaldéhyde)

WOOD PROCESSING IN BELGIUM

- 1st wood processing (roundwood)
  - Forest clearing
  - Saw&planermills, wood preservation,...
  - 140 companies – 1.600 employees
- 2nd wood processing
  - Boards manufacturers
  - Carpenter/furniture maker, project market
  - Construction – building - outdoors
  - Pallets, boxes, …
  - 1.200 companies – 18.500 employees

Species	m3
poplar	320.000
oak	170.000
beech	65.000
other	35.000
coniferous	2.500.000

www.houtinfobois.be

SME's
Family businesses
Limited knowledge of prevention

IARC MONOGRAPHS 100C–15 (2012)

- There is *sufficient evidence* in humans for the carcinogenity of wood dust
  - Wood dust causes cancer of the nasal cavity and paranasal sinuses and of the nasopharynx
- There is *inadequate evidence* in experimental animals for the carcinogenicity of wood dust

- Wood dust is *carcinogenic tot humans (group 1)*

First study: Vol 62 – 1995
details about hard/softwood

> There is consistent and strong evidence from both case–control studies and large cohort studies that wood dust causes sinonasal cancer. Most of these studies do not specify the histology of the tumours. Among the case–control that specified histology, very large excess risks were observed for sinonasal adenocarcinoma and wood dust exposure. Case series have found a large proportion of adenocarcinoma cases to be woodworkers.

EUROPE: DIRECTIVE 2017/2398

amending Directive 2004/37/EC on the protection of workers from the risks related to exposure to carcinogens or mutagens at work

'ANNEX III

Limit values and other directly related provisions (Article 16)

A. LIMIT VALUES FOR OCCUPATIONAL EXPOSURE

Name of agent	EC No (1)	CAS No (2)	Limit values (3)			Notation	Transitional measures
			mg/m³ (4)	ppm (5)	f/ml (6)		
Hardwood dusts	—	—	2 (7)	—	—	—	Limit value 3 mg/m³ until 17 January 2023

the limit is referred to the **inhalable fraction of the hardwood dust** and

"if hardwood dusts are mixed with other wood dusts, the limit value shall apply to all wood dusts present in that mixture".

List of the CMR agents
Harmonised mandatory limit value
No harmonised measurement method

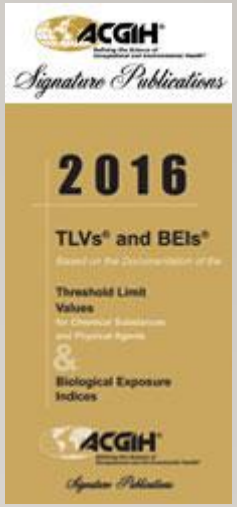
Trade union demand:
Stricter binding limit value for Wood dust

Proposed Amendments:
Annex III (A) should read:

Name of agent	*EINECS*	*CAS*	*Limit values* mg/m³		*Notation*	*Transitional measures*
~~*Hardwood dust*~~ ***Wood dust***	-	-	~~*5.0*~~*(1)* ***1.0****(1)*		-	***2 mg/m³ until (3 years after entry into force)***

(1) inhalable fraction

BELGIUM
KB-AR 2/9/2018 MODIFICATION LIMIT VALUES



Consultation procedure by HogeRaad of 2.5.2017 for amendment of GW/VL,
- update of limit values list ACGIH from 2009 to 2016
- transposition directive - 4th list limit values

In the Codex, Annex VI.1.1. includes the following limit values.

Name of the agents	Limit value (mg/m3)	Add. classification
Wood dust: all species except Thuja plicata	1	C (hardwood dust)
Wood dust: Western red cedar (Thuja plicata)	0,5	C (hardwood dust)

BS/MB: 3/10 => 13/10/2018

BELGIUM
CARCINOGENIC SUBSTANCES

C (hardwood dusts) => scope of title 2 on carcinogenic, mutagenic and reprotoxic agents of book VI of the Codex on Well-being at Work

Working with hardwood dusts is carcinogenic, in **Annex VI, 2.2 are examples**

Hardwood and tropical species, including poplar and willow

Latin name	ENG name	Latin name	ENG name
Acer	Maple	*Agathis australis*	Cowry
Alnus	Alder	*Chlorophora excelsa*	Iroko
Betula	Birch	*Dacrydium cupressinum*	Rimu, red pine
Carya	American walnut	*Dalbergia*	Rosewood
Carpinus	Hornbeam	*Dalbergia nigra*	Brazilian rosewood
Castanea	Chestnut	*Diospyros*	Ebony
Fagus	Beech	*Khaya*	African mahogany
Fraxinus	Ash	*Mansonia*	Mansonia
Juglans	Walnut	*Ochrama*	Balsa
Platanus	Sycamore	*Palaquium hexandrum*	Nyatoh
Populus	***Poplar***	*Pericopsis elata*	Afrormosia
Prunus	Cherry	*Shorea*	Meranti
Salix	***Willow***	*Tectona grandis*	Teak
Quercus	Oak	*Terminalia superba*	Limba
Tilia	Linden	*Triplochiton scleroxylon*	Obeche
Ulmus	Elm		

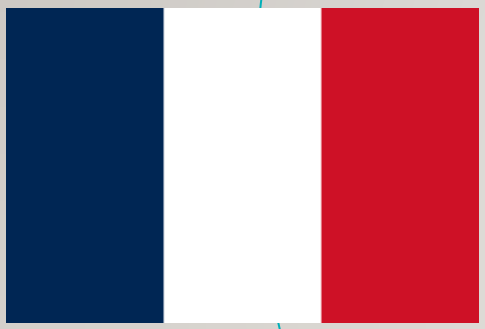
Note: IARC vol62 (1995)

NETHERLANDS

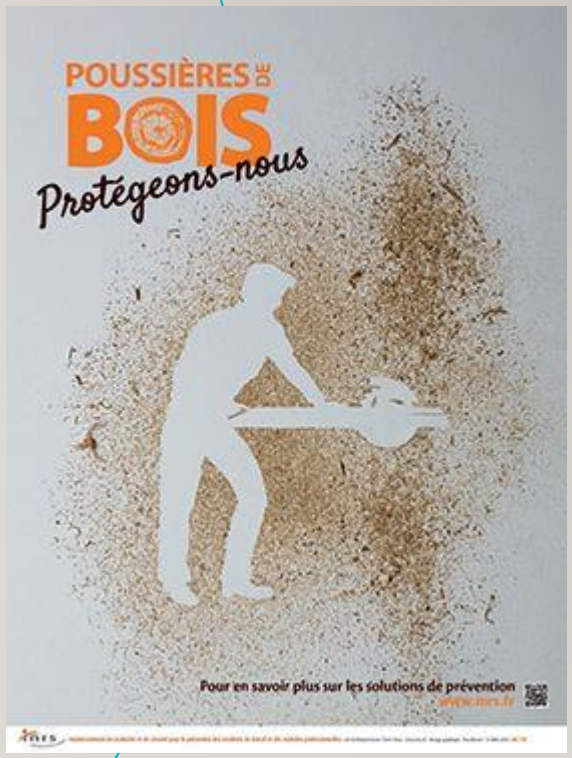
- Hardwood dust TGG (8h) = 2 mg/m3 (inhalable)
- Definition of hardwood dust according to the International Agency for Research on Cancer (IARC) of wood based on botanical characteristic:
  wood of angiosperms = hardwood
- If hardwood dusts are mixed with other wood dusts, the limit value for hardwood dusts applies to all wood dusts in that mixture.

http://www.houtstoftotnadenken.nl/

FRANCE



- **VLEP (8h) = 1 mg/m3 (inhalable)**
- Les travaux exposant aux poussières de bois = **procédés cancérogènes (tous les types de bois)**
- Des mesures de prévention particulières et un **suivi individuel renforcé**



https://www.inrs.fr/risques/poussieres-bois/ce-qu-il-faut-retenir.html

GERMANY

- “TRK-werte”: 2 mg/m3 (inhalable)
- Cancerogenic:
  - List form IARC 1995: proven carcinogenic, other suspect carcinogenic
- Technical rules for wood processing sector:
  - Extraction obligation and rules for good operating of
  - Use of compressed air and dry sweeping is forbidden, unless masks are mandatory
- DGUV-guidelines from the BGHM

UK

- WEL (8h) for hardwood dust is 3mg/m3.
- WEL (8h) for softwood dust is 5mg/m3.
- For mixtures of hardwood and softwood dusts the WEL for hardwood dust of 3mg/m3 applies to all wood dusts present in that mixture.
- Adequate control of wood dust is achieved when:
  - The eight principles of good control practice are applied as set out in Schedule 2A of COSHH;
  - Exposure is below the relevant WEL; and
  - Exposure is reduced to as low a level as is reasonably practicable

https://www.hse.gov.uk/woodworking/videos/wood-dust-exposure.mp4

WHERE THE DUST COMES FROM ?

- Machine operations: sawing, planing/milling, drilling
  - Extraction on fixed machines (usually effective, sometimes not …)
  - Small cut off saws (often without extraction)
  - Radial arm saws (difficult to extract)
  - Package saws and chainsaws (no extraction – intended for outside use)
  - Other manual feed (often solid wood): operator holds piece and is close to source
- Manipulating dusty machined parts
- Polishing and sanding with handheld sanders
- Older CNC machines …
- Automated lines with high volumes for planing, sawing, etc.
- *Use of compressed air - blowing out machines - floor - ...*

RISK ASSESSMENT

1. Processed woodtypes: what are the risks, in particular carcinogenic, allergenic, etc.?
2. Sources and how much dust is released: volume => % dust
3. High-risk activities with high exposure
4. Measures at the source: extraction
5. Exposed people and estimation of the extent and duration of exposure
6. Exposure (vs. limit values): measurements required? (see also standard EN689)

TO MEASURE IS TO KNOW?

"METEN IS WETEN"

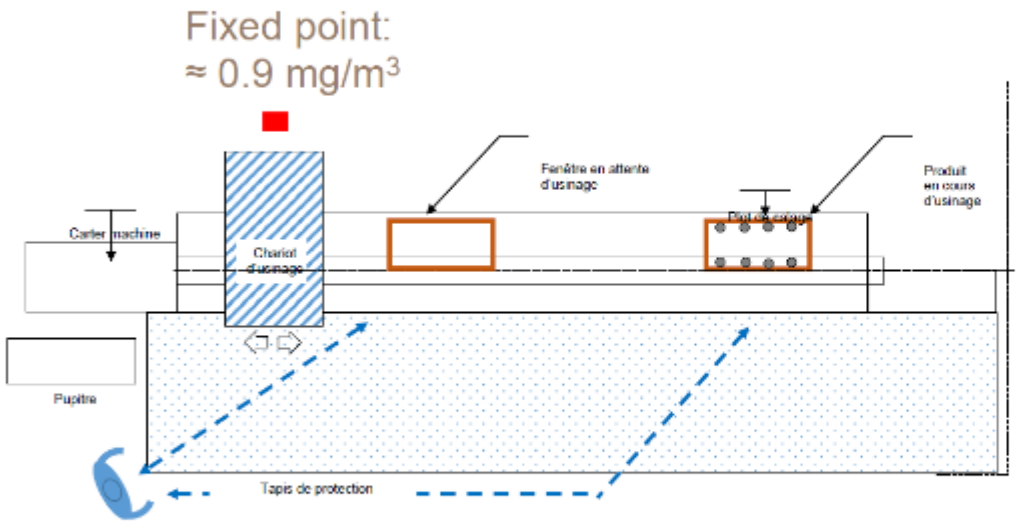
- Or measure what you already know ... or can't measure (accurately)
- Wood dust – hard – soft – other dust
- Variability in tasks
  - operator operates different machines
  - use of compressed air
- NBN 689 = SEG ? 3 to 5 measurements ?
- Measuring is also creating (un)awareness
- Visualisation -> Tyndall lamp or dust lamp

Activity	Conc (µg/m3
sawmill: sawing and planing	**1312**
carpenter: panel sizing CNC/edge bander	**961**
General warehouse worker(polyv.)	279
Automatic cut-off saw, etc.	198
carpenter: polyvalent	**5198**

Description	Conc (µg/m3)
(oude) CNC	951
Radial Arm saw	737
Planer	517
Sawing & milling Aut	2077
Panel saw	805

THE USE OF COMPRESSED AIR

Case Studies - CNC Machining Center



Operator:
< 0.2 mg/m³

Cleaning phase:
2.7 mg / m³ over 18 minutes

Lessons learned ?

- Classification of the machine in the most emissive
- Low exposure because operator away from the source of emission
- Cleaning, a very exposing practice

15

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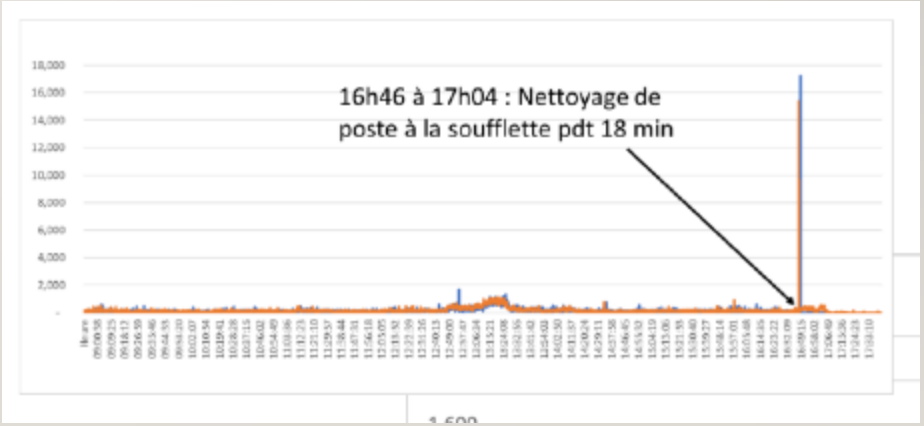
One measered value over a shift …



Direct reading
Real time

ProPoBOIS - OPPBTP

DUST EXTRACTION

WHERE CAN IT GO WRONG?

DUST EXTRACTION

Visible or measurable

- Insufficient diameter, insufficient speed, insufficient flow rate
  - *Manual or supplier? (German guideline)*
  - *Speed 20 m/s (28 m/s), depends on the type of machine*
- Pipes not (properly) connected or leaks in the pipes
- Couplings: not fitting diameters, tape, ...
- Valves not open; depending on operator -> automatic valves
- Flexibles that are far too long, sharp bends
- Blockages by dust or pieces of wood
- *Machine design - too few or not well positioned extraction hoods*

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CHECKPOINTS DUST EXTRACTION

- At purchase and commissioning:
  - Machine or Collective protection ? Codex requirements and standards
  - NBN EN 12779 (2015)
  - NBN EN16770 (2018) for indoor installations > 8000 m3/h
  - Airrecirculation – dust load ?
  - Easy to emptying (without dust emissions)

On delivery: functional tests ! measurements ! manual / instructions ! (see standard)

- In use: visual check (daily), functional check and measurements (annually).
- Emptying of the dust collection: container, silo, bags, ...
- Guidelines for necessary and possible interventions in case of problems / maintenance

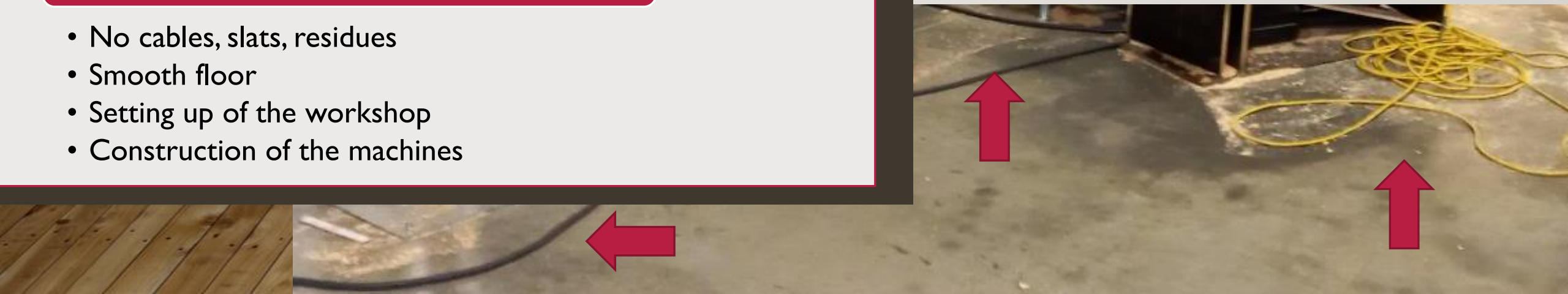
GOOD CLEANING PRACTICES (1)

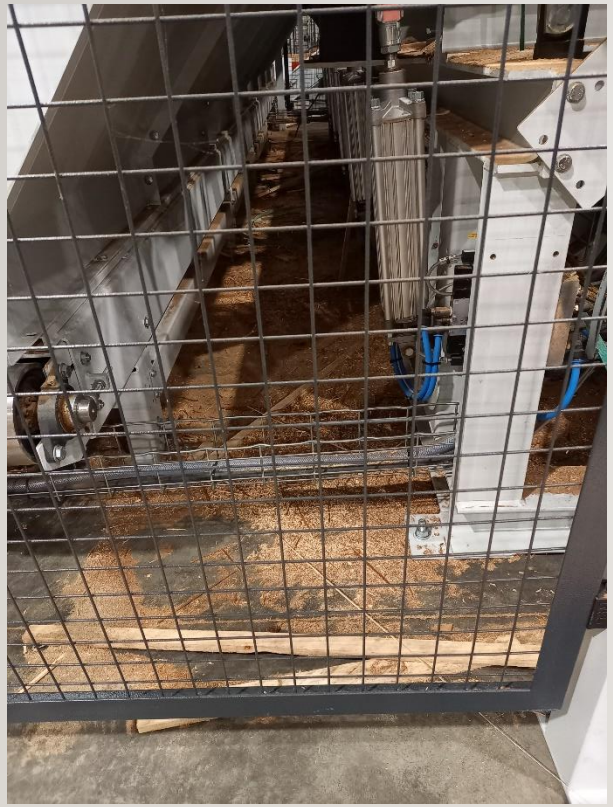
Fixed and clear cleaning schedules

- Do dust not allow to accumulate on the floor, in dead corners, on tubes, in machines, …
- Fixed schedule: daily, weekly
- Awareness and supervision

Workarea easy to clean

- No cables, slats, residues
- Smooth floor
- Setting up of the workshop
- Construction of the machines





Difficult-to-reach places

GOOD CLEANING PRACTICES (2)

No brooms

- Use a squeegee
- Use ‘flakes’ (“keervlokken”)
- Floor cleaning machines

No compressed air “ALessARA” principle

- Optimalize extraction and use vacuum cleaners

THE END OF THE SHIFT …

reverse hoover

cleaning booth

CYAGO
Drying & blowing solutions

VACUUMING VS DUST EXTRACTION

VACUUMING

- Fine diameter, narrow nozzle
- Centrifugal pump
- Low flow rates: 240 m3/h
- High vacuum: e.g. 24,000 Pa
- Limited storage (bag, …)
- *Limited volume/mass*

DUST EXTRACTION

- Large diameter
- Fan
- Large volume flows: 1,500 - . .000 m3/h
- Low vacuum: 4,000 - 2,000 Pa
- Large capacity for storage (silo, container)
- *Large volumes / masses*

Central high vacuum system

INRS, ED6052, 2009

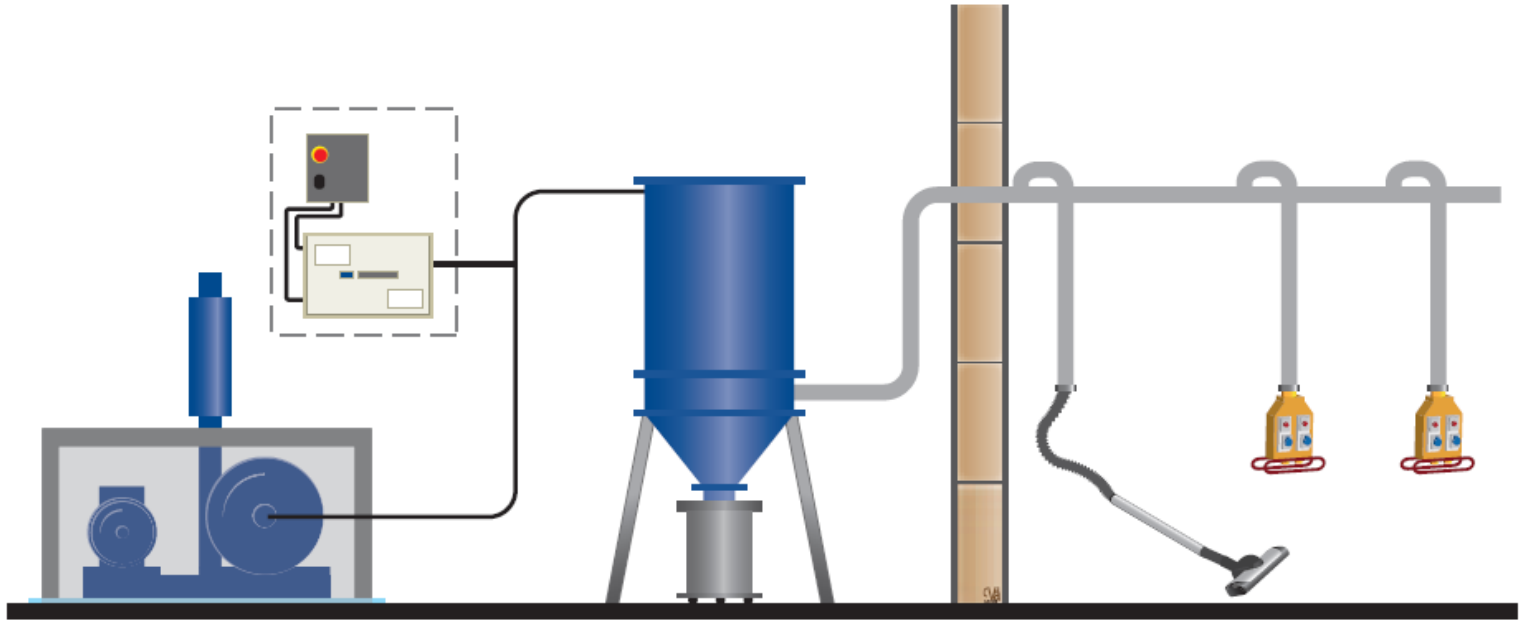


Figure 1. **Exemple de configuration de réseau d'aspiration haute dépression**

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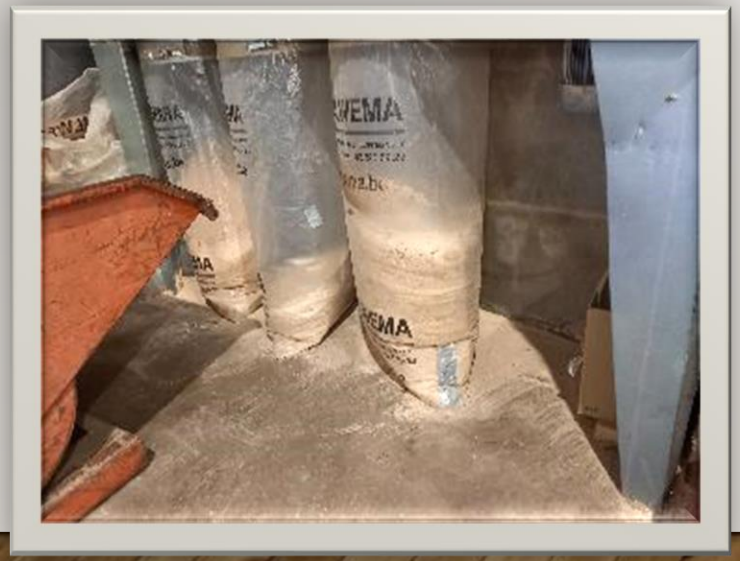
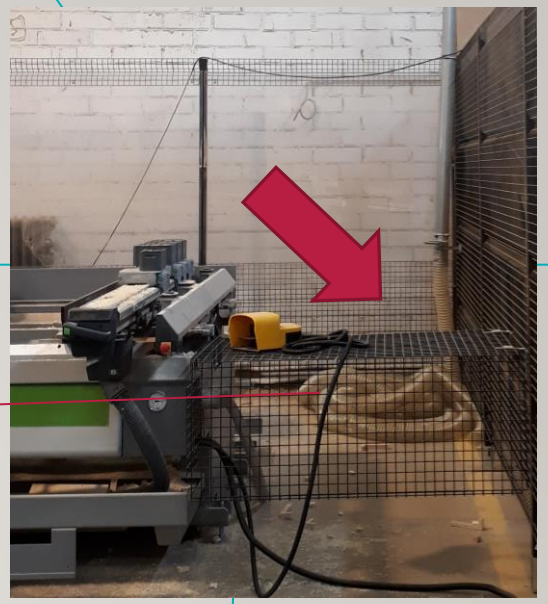
DUST COLLECTION AND REMOVAL

- Scooping up the dust and throwing it in the (open) container
- Bags of mobile units in container
- Blowing away dust = no collection

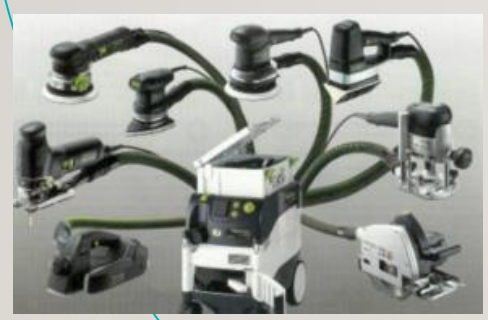


GOOD REMOVAL PRACTICES

- Extraction with extra ducts connected to the central extraction system
- Floor sweep collectors
- Mobile hoovers
- Floor cleaning machines
- Personal protection during removal



MOBIELE (HAND)WERKTUIGEN - SCHUURTAGELS



PERSONAL PROTECTION

- Selection of respiratory masks -> usually FFP2/3
  - Comfortable to wear, "try on", test, ...
- Make and keep available: sufficiently and easy to get
- Information to operators: why when how to wear how to store and to replace "SMART-principle"
  - S: when a must, when preferable
  - M: visible
  - A&R: discuss with operators, possibly in stages, e.g., start when cleaning the workplace and machines.
  - T: from when and for how long focus
- Supervision and evaluation -> motivation and awareness
- Fit testing … Hygiene (Covid)masks …

CREATING AWARENESS

www.woodwize.be
www.fedris.be

De risico's in uw bedrijf beperken?

Wij helpen u graag verder met deze handige tips!

CLB EXTERNE PREVENTIE

We zijn ver gekomen sinds de tijd van hamer en beitel maar dat zorgt ook voor flink wat risico's. Wie werkt binnen de houtbewerkingsindustrie loopt dagelijks risico op snijwonden, geknelde ledematen of erger. Daarnaast brengt de stof die vrijkomt niet enkel gezondheidsrisico's met zich mee, maar ook een brandrisico. Wij zetten de belangrijkste risico's en wat u eraan kan doen even voor u op een rijtje.

A. Machineveiligheid

Werken met machines brengt veel risico's met zich mee. Dat geldt zowel voor handgereedschap als voor vaste machines. Elk jaar vallen er helaas doden en houden honderden mensen blijvende letsels over aan accidenten. Meer dan de helft van de ongevallen doen zich voor tijdens het bedienen van een machine. Vaak doordat de beveiliging omzeild wordt of omdat er wordt ingegrepen terwijl de machine nog draait. Met alle gevolgen van dien.

- Breng voldoende waarschuwingsmarkering aan.
- Scherm draaiende onderdelen af.
- Plaats afzuiginstallaties om vrij stof te beperken.
- Filter de afgezogen lucht met een luchtfilterinstallatie.
- Breng uw medewerkers op de hoogte van de veiligheidsregels en controleer of zij deze naleven

B. Blootstelling aan houtstof

Houtstof komt vrij tijden het zagen, schuren, frezen... Dit kan een risico vormen voor de gezondheid van uw medewerkers. De hoeveelheid stof hangt af van het materiaal en gereedschap dat u gebruikt.

- Gebruik materiaal en werkmethodes die zo min mogelijk stof veroorzaakt.
- Opteer voor materiaal met goede (punt)afzuiging.
- Onderhoud uw gereedschap en afzuiginstallaties.
- Maak de werkplek regelmatig schoon met aangepaste materialen (industriestofzuiger).
- Beperk het personeel dat wordt blootgesteld (afschutting tussen werkruimtes).
- Deel persoonlijke beschermingsmiddelen uit als bovenstaande maatregelen onvoldoende resultaat opleveren.

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www.clbgroup.be/externe-preventie

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FEDERALE OVERHEIDSDIENST
Werkgelegenheid, Arbeid en Sociaal Overleg

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Belgisch kenniscentrum over welzijn op het werk

HOME | BLOG | Campagne en studiedag over houtstof

Campagne en studiedag over houtstof

09.11.2021

https://www.beswic.be/nl/blog/campagne-en-studiedag-over-houtstof

C. Brand & explosiegevaar

CLB EXTERNE PREVENTIE

1 Defecte elektronica
- Zorg dat de kabels niet over de vloer lopen en dat er niets op staat.
- Zorg voor kabelgoten.
- Inspecteer bewegende kabels regelmatig op metaalmoeheid.
- Stem de afzuiging goed af op de productie.
- Schaf stofdichte verlichtingsarmaturen aan.

2 Oververhitting van machines
- Houd de ventilatieopeningen van de machines proper.
- Verwijder dagelijks houtmot tussen en rond de machines.
- Bekijk de gevolgen voor bv. de motafzuiger bij ingebruikname van nieuwe machines.

3 Bot gereedschap
- Controleer en vervang gereedschap regelmatig.
- Verwerk niet meer dan de maximum toegelaten capaciteit.
- Zorg voor vonkdetectie en vonkblussing in de leidingen.

4 Stofexplosie
- Gebruik een motfilter die werkt op basis van onderdruk.
- Zorg voor vonkdetectie en vonkblussing in de afzuigkanalen.

5 Statische elektriciteit
- Zorg dat de afzuiginstallatie volledig uit metalen delen bestaat.
- Zorg ervoor dat kunststofslangen geaard zijn als ze een metalen kern bevatten.

6 Broei
Er worden steeds meer producten gebruikt waarin sneldrogende natuurlijke oliën en wassen zijn verwerkt. Vaak beter voor het milieu maar erg brandgevaarlijk.

Materialen die doordrenkt zijn kunnen na gebruik spontaan ontvlammen. Als dit type olie of was opdroogt, komt er warmte vrij. Kan het materiaal deze warmte niet kwijt, dan ontstaat er broei. Dit gebeurt bijvoorbeeld als er veel doeken op een hoop liggen. De temperatuur kan zo hoog oplopen dat het materiaal gaat smeulen en vervolgens ontvlamt.

- Gooi vuile doeken in de daarvoor bestemde metalen bak met deksel.
- Laat de afzuigwant minimum 15 minuten aan na de laatste spuitbehandeling.
- Plaats een drukverschilmeter die waarschuwt als filtermateriaal vervangen moet worden.
- Spuit geen verfspuiten proper met thinner voor de afzuigwand.
- Doe vervuilde filter in een stalen vat met deksel en klemband. Plaats deze minimum 5 meter van het gebouw.
- Installeer sprinklerbeveiliging voor en achter de afzuigwand.
- Zorg dat de spuiterij brandwerend is en de toegangsdeuren automatisch sluiten.

7 Roken
Een brandende sigaret die tijdens werkzaamheden in een machine valt. De afloop laat zich raden.

Hoe onvoorstelbaar ook, dit gebeurt vaker dan u denkt! Iedereen weet dat roken op de werkplek verboden is. Maar wordt deze regel ook nageleefd in uw bedrijf?

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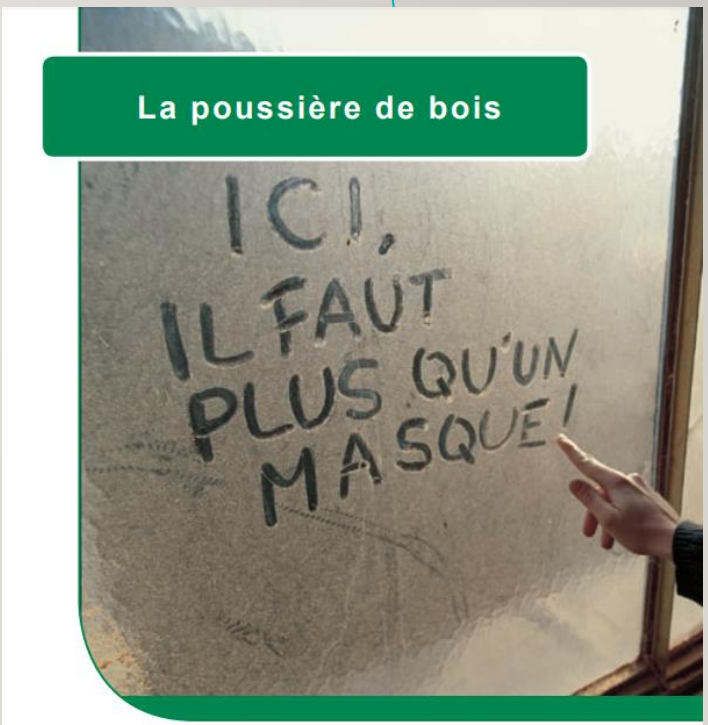

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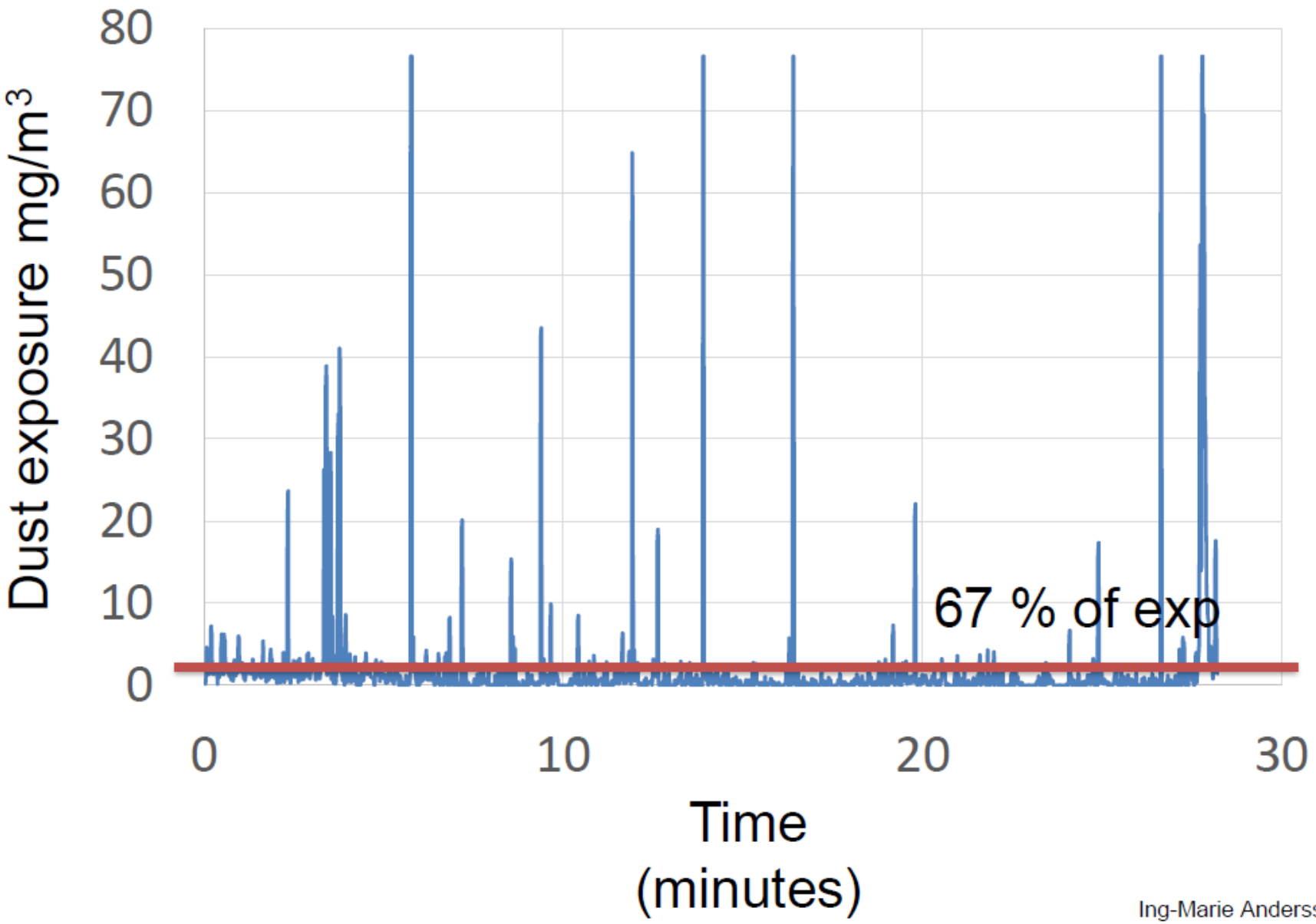

Visualisation of the exposure of wood dust and how to reduce the exposure peaks

PIMEX
combined use of real time monitoring for wood dust and video

26 movies with typical activities

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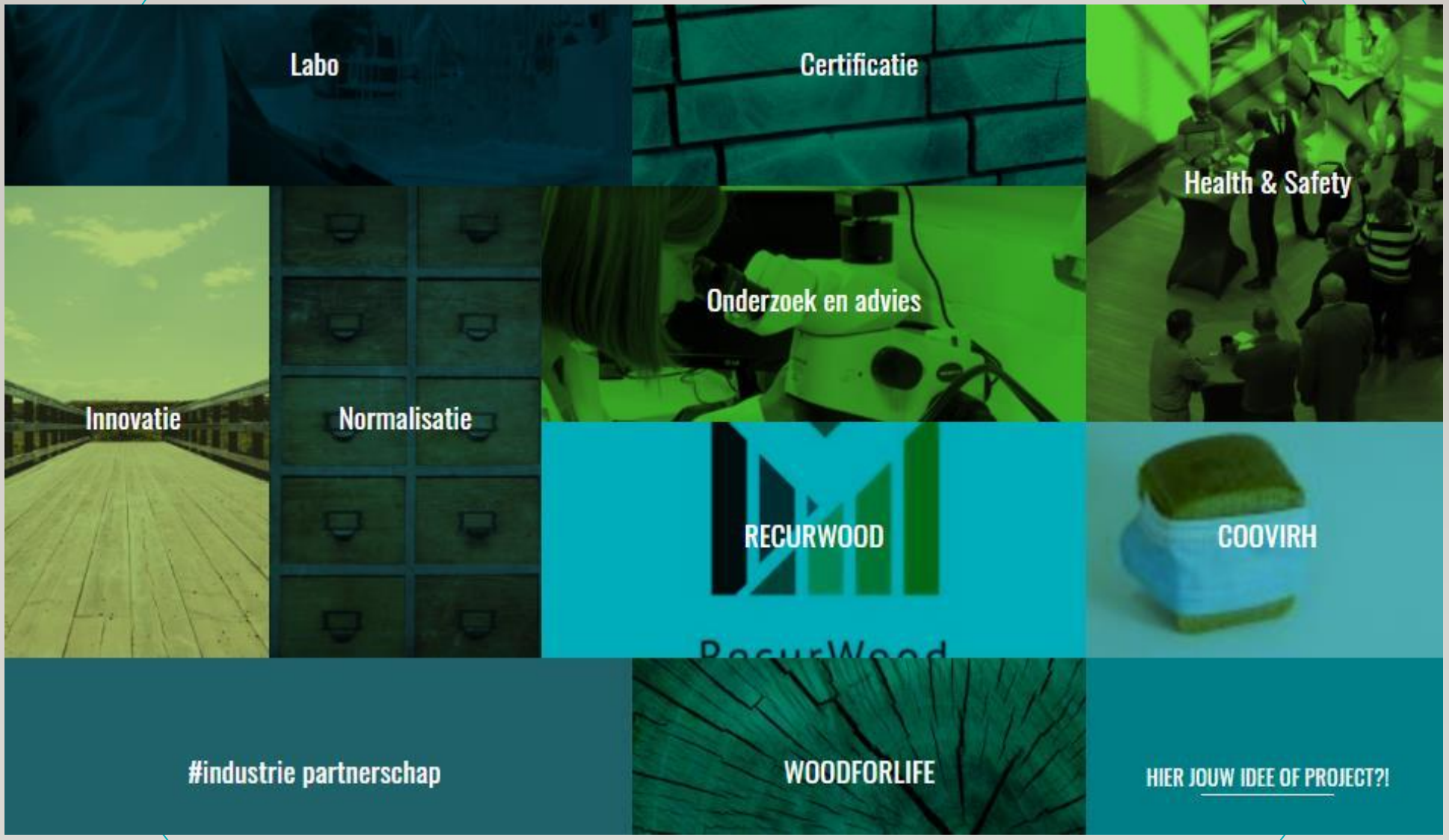
https://www.woodwize.be/zweden/start.html

WOODWIZE

nooit op eigen houtje


Labo
Certificatie
Health & Safety
Innovatie
Normalisatie
Onderzoek en advies
RECURWOOD
COOVIRH
#industrie partnerschap
WOODFORLIFE
HIER JOUW IDEE OF PROJECT?!