



Building Green Together
Digital Platform for Green Construction Learning



Erasmus+

Co-funded by
the European Union

Safety on Site: Eco-Construction

**Partnership for green models in the vocational training of
construction workers, project number: KA2 - Agreement Number:
2025-1-BG01-KA210-VET-000362824**



Presented By

Diego Cabo Valcarce

Jorge Fco. Alarcón Liñán



Social Media

<https://ecobuildtraining.eu/index.php?lang=en>

The "Natural is Safe" Myth

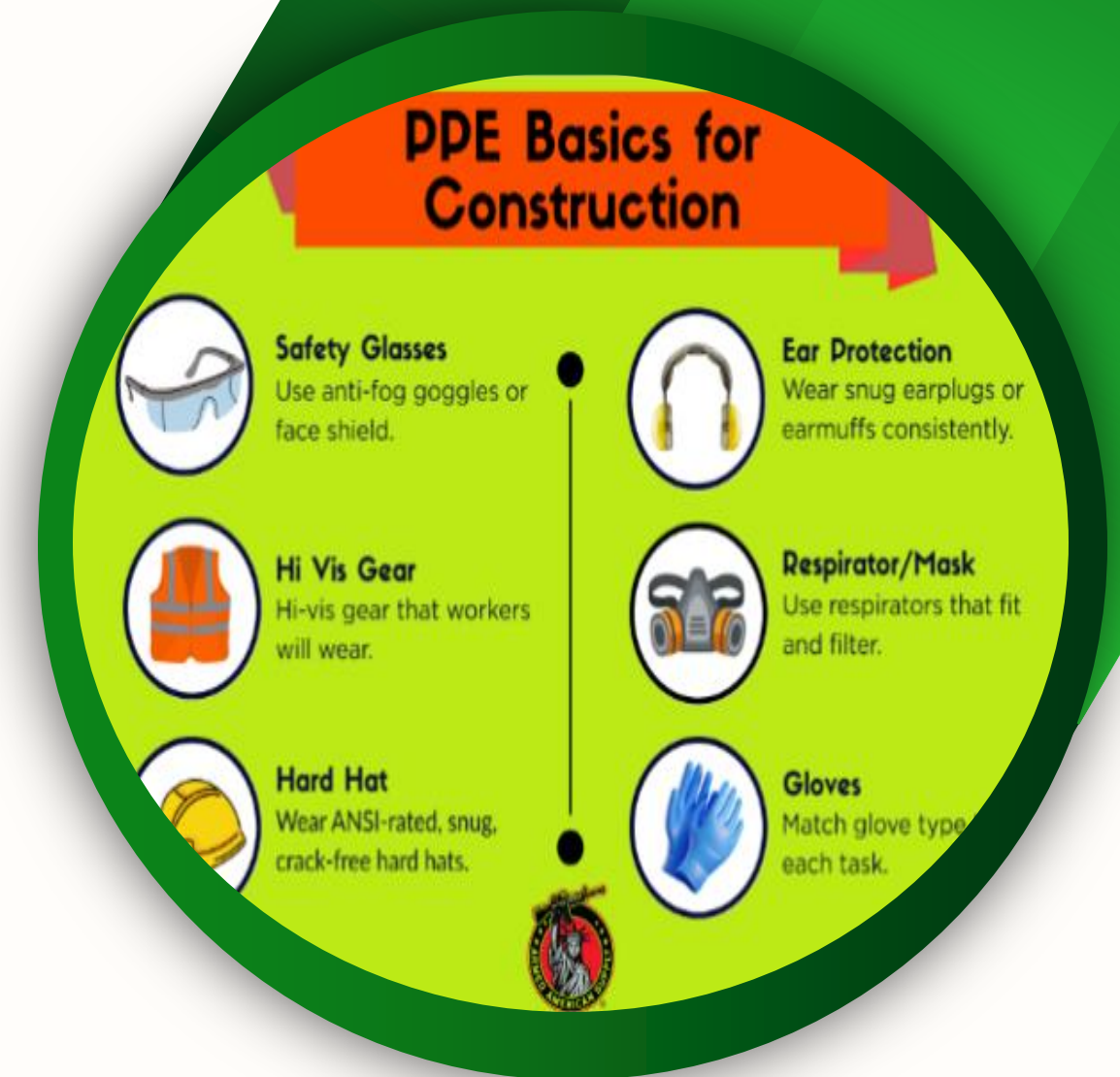
Eco-Materials Still Require Vigilance

Common Misconception: Trainees often assume that because a material is non-synthetic or organic (e.g., lime, hemp, clay, wood fiber), it is inherently harmless to human health.

Chemical & Physical Threats: Natural materials can be highly caustic, produce fine respirable dust, contain natural allergens, or host fungal spores.

Occupational Health Imperative: Sustainable construction mandates strict adherence to health & safety standards equal to conventional job sites.

Trainer Guidance: Instill professional safety habits early in VET practical workshops before handling raw bio-based products.





Caustic material and Chemical sensitizers

Lime mortars and plasters (pH 12-13)

Severe Chemical Burns: Quicklime (CaO) and slaked lime (Ca(OH)_2) react exothermically with water or sweat, causing tissue necrosis and eye damage.

Corrosive Action: Contact with moist skin causes deep alkaline burns without initial pain warnings, making preventive barrier creams and gloves mandatory.

Caustic material and Chemical sensitizers



ELIMINATION

Remove the hazard entirely from the workplace.



SUBSTITUTION

Replace hazardous chemicals with safer alternatives.



ISOLATION

Physically separate people from chemical risks.



ENGINEERING CONTROLS

Use systems like ventilation to reduce exposure.



ADMINISTRATIVE CONTROLS

Adjust work policies, schedules, and training to minimize risk.



PERSONAL PROTECTIVE EQUIPMENT (PPE)

Equip workers with gear like respirators and gloves.

Natural resins, Oils and Bihders

Sensitizers & Allergens: Solvents like turpentine, natural pine resins, and plant-based oils can induce severe contact dermatitis and allergic sensitization.

Volatile Organic Compounds (VOCs): Natural VOCs emitted during spray applications can cause respiratory irritation and central nervous system fatigue.

Respiratory risk and Bio-Insulation handling



Handling Bio-Insulation Safely

Bio-Insulation Types: Hemp hurds, blown wood fiber, expanded cork granules, and recycled cellulose insulation.

Airborne Particulates: Cutting or blowing bio-insulation generates dense organic dust clouds that penetrate deep into pulmonary alveoli.

Biological Contaminants: Raw bio-materials may carry mold spores, endotoxins, or micro-fungi causing Organic Dust Toxic Syndrome (ODTS).

Dust Management Protocol: Always utilize localized extraction, mechanical dust collectors, and well-ventilated cutting zones.

Essential PPE Kit for Green building sites

Respiratory Protection

FFP2 / FFP3 Respirators: Essential for filtering fine wood dust, bio-fibers, lime powder, and mold spores during installation.



Essential PPE Kit for Green building sites

Eye & Face Protection

Sealed Safety Goggles: Indirect-vent anti-fog goggles preventing lime splashes, airborne fibers, and spray-applied insulation.



Essential PPE Kit for Green building sites

Dermal & Hand Protection

Alkali-Resistant Gloves: Heavy-duty nitrile or neoprene gloves protecting against caustic lime burns (pH 12–13) and resins.



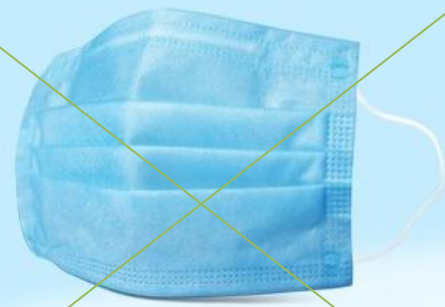
Essential PPE Kit for Green building sites

Ergonomic Aids

Mechanical Hoists & Lifts: Vacuum lifters and material trolleys minimizing lumbar strain during heavy block placement.



PPE Standards and Selection criteria



FFP1
80%



FFP2
94%



FFP3
99%

FFP2/FFP3 Masks & Sealed Goggles

FFP2 Masks (EN 149): Mandatory for general bio-insulation handling (hemp, cork, straw dust) filtering $\geq 94\%$ of particles.

FFP3 Masks (EN 149): Required for dry lime mixing, sprayed cellulose, and toxic dusts filtering $\geq 99\%$.

Sealed Goggles (EN 166): Must feature 3-level impact resistance and liquid splash protection (class 3) against caustic splashes.

PPE Standards and Selection criteria



Chemical Gloves & Lifting Supports

Alkali-Resistant Gloves (EN 374): Extended cuff nitrile gloves preventing skin exposure during lime plastering and wet masonry.

Barrier Creams & Hygienic Wash: Apply protective dermal creams before work and flush skin with neutral pH eye/skin rinse if exposed.

Ergonomic Back Belts & Hoists: Use powered material hoists for hempcrete blocks weighing >15 kg.

Ergonomics and Physical load management

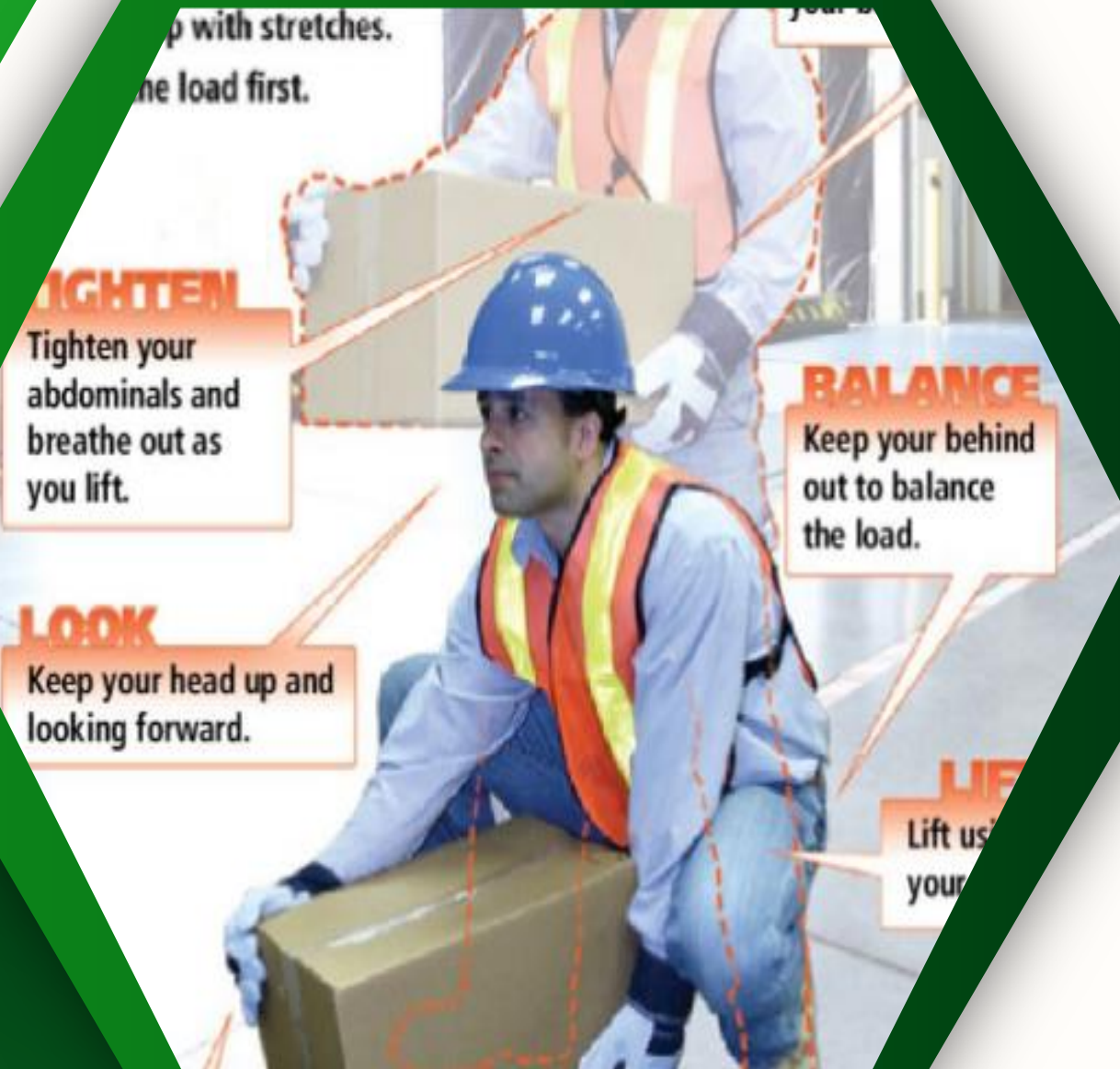
Preventing Musculoskeletal Disorders (MSDs)

Correct Lifting Technique: Bend knees, maintain a neutral spine, keep loads close to the torso, and avoid twisting while lifting.

Team Lifting Protocol: MANDATORY 2-person lift for loads exceeding 20 kg (e.g., rammed earth blocks, dense timber beams).

Workstation Heights: Elevate mortar mixing trays and block cutting tables to hip level to prevent repetitive stooping.

Job Rotation: Rotate workers between heavy masonry, plastering, and light insulation tasks every 2 hours.



Fire safety during construction

Managing Bio-Material Storage Areas

High Hazard Period: Loose straw bales, unrendered hemp hurds, and wood fiber insulation are extremely flammable before installation.

Strict No-Smoking Policy: Enforce total "No Smoking" and "No Open Flame" zones within 20 meters of bio-storage areas.

Hot Work Permits: Strictly isolate welding, angle grinding, or torching from stored organic materials.

Fire Extinguishers: Position multi-purpose Class A Water/Foam extinguishers immediately adjacent to material stockpiles.



Hazardous waste and Legacy toxins



Abestos and Lead abatement

Asbestos Containing Materials (ACMs): Stop work immediately if friable insulation or fiber cement is discovered. Requires certified asbestos contractors.

Lead-Based Paint: Scraping or heat-sanding old paint layers releases toxic lead dust requiring HEPA vacuums and specialized containment.

Hazardous waste and Legacy toxins

Solvents and Treated timber

CCA Treated Timber: Chromated Copper Arsenate (CCA) pressure-treated wood generates highly toxic ash and dust when cut or burned.

Solvent & Chemical Waste: Collect residual wood preservatives, synthetic resins, and stripping solvents in labeled hazardous waste drums for specialized disposal.



Safety video

Interactive Video Audit & Analysis

Video 1 — Safe Lifting Techniques:

<https://www.youtube.com/watch?v=z4epelusue0>

Covers the 5 P's: Plan, Position, Pick, Proceed, and Place.

Video 2 — Essential PPE:

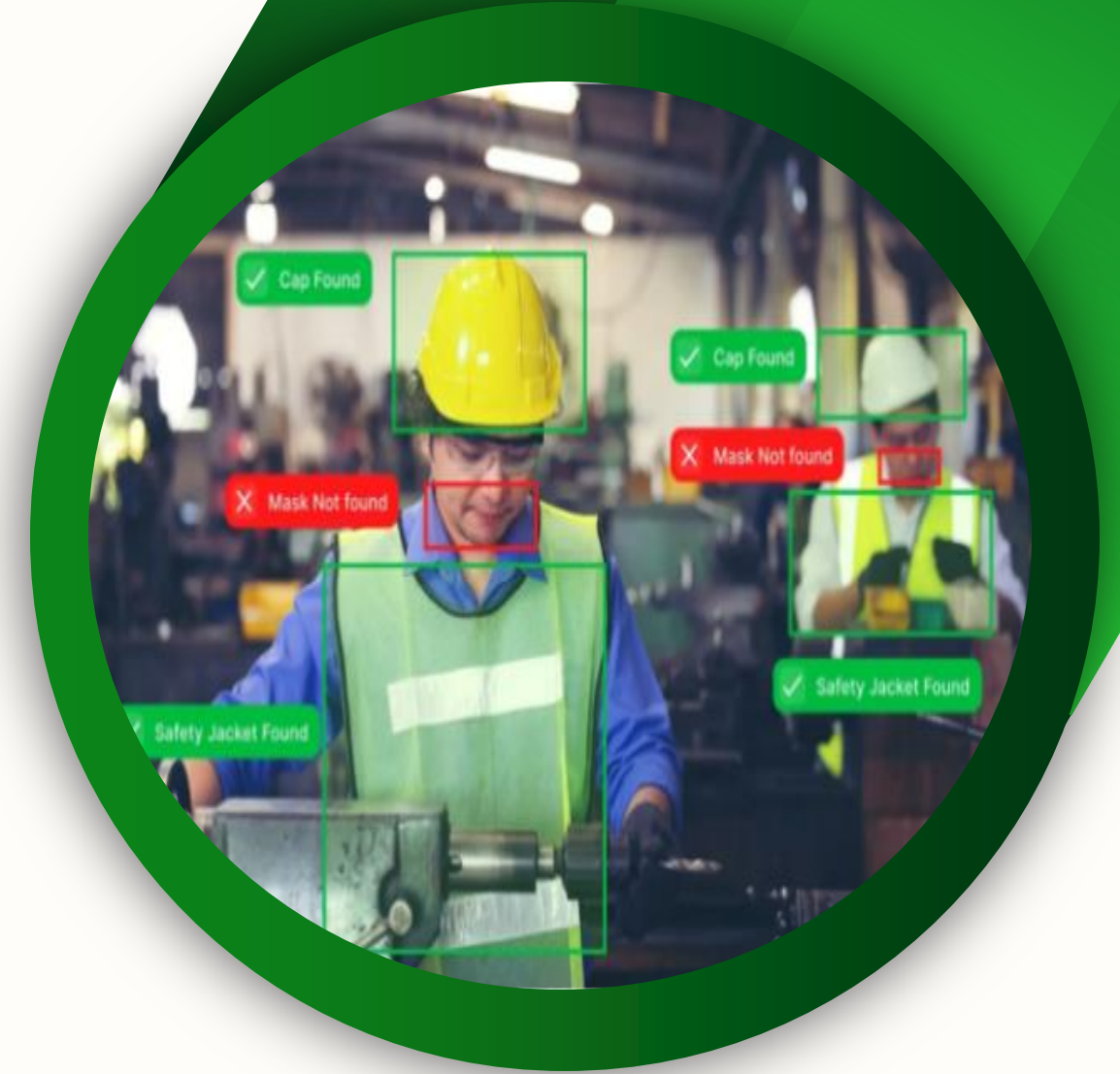
https://www.youtube.com/watch?v=LL1e55Dnd_g

It shows which PPE is necessary and when to use it on a construction site

Video 3 — RISK on Construction :

https://www.youtube.com/watch?v=i_YdOG-AuAQ

Risks and hazards on a construction site.



On-Site safety and PPE

SUMMARY

Material / Task	Primary Hazard	Required PPE	Site Safety Protocol
Lime Mortar & Render	Severe chemical burns (pH 12–13), eye injury.	Sealed goggles, nitrile chemical gloves, FFP3 mask.	Eyewash station within 10m; wash splashes with neutral water immediately.
Hemp & Wood Fiber	Airborne organic dust, respiratory irritation.	FFP2 respirator, safety glasses, dust-resistant overalls.	Use local exhaust ventilation (LEV); avoid dry sweeping (use HEPA vacuum).
Straw Bale Storage	Flash fire risk, loose dry organic fuel.	Standard PPE, high-visibility vest, fire-resistant clothing.	Enforce 20m No-Smoking perimeter; keep Class A extinguishers ready.
Legacy Retrofits	Asbestos fibers, lead dust, CCA treated wood.	P3 full-face respirator, Disposable Tyvek suit, heavy gloves.	Isolate site zone; do NOT burn treated wood; contact certified disposal team.



THANK YOU
FOR YOUR ATTENTION

