

Construction Hazards and Risks Control

Lecture Title: Waste Management and Pollution Control

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Undergraduate Diploma in
Occupational Health and Safety

Why Waste Management Matters in Construction?

- Construction waste management is critical because it:
 - Represents one of the largest waste streams globally
 - Directly impacts worker health and safety
 - Creates environmental pollution risks (air, water, soil)
 - Involves significant legal liability
 - Has major financial implications
 - Affects company reputation and sustainability performance



What is Construction Waste?

- Definition: Any substance or object discarded during construction, demolition or renovation.
- Examples of Construction Waste:
 - Inert waste
 - Non-hazardous waste
 - Hazardous waste
 - Special waste

Defining Waste – The Legal Perspective

- Under UK waste guidance (as referenced by the Health and Safety Executive and environmental regulators), waste is defined as:
 - Any substance or object that the holder discards or intends to discard.
- A material becomes waste not because it is useless, but because the holder chooses to discard it.
- For example:
 - Surplus concrete = waste if discarded
 - Surplus concrete reused on site = not waste
 - Timber off-cuts reused in formwork = resource, not waste

Common Construction Waste

- Concrete & masonry
- Timber
- Metals
- Plastics
- Packaging
- Soil & excavation material

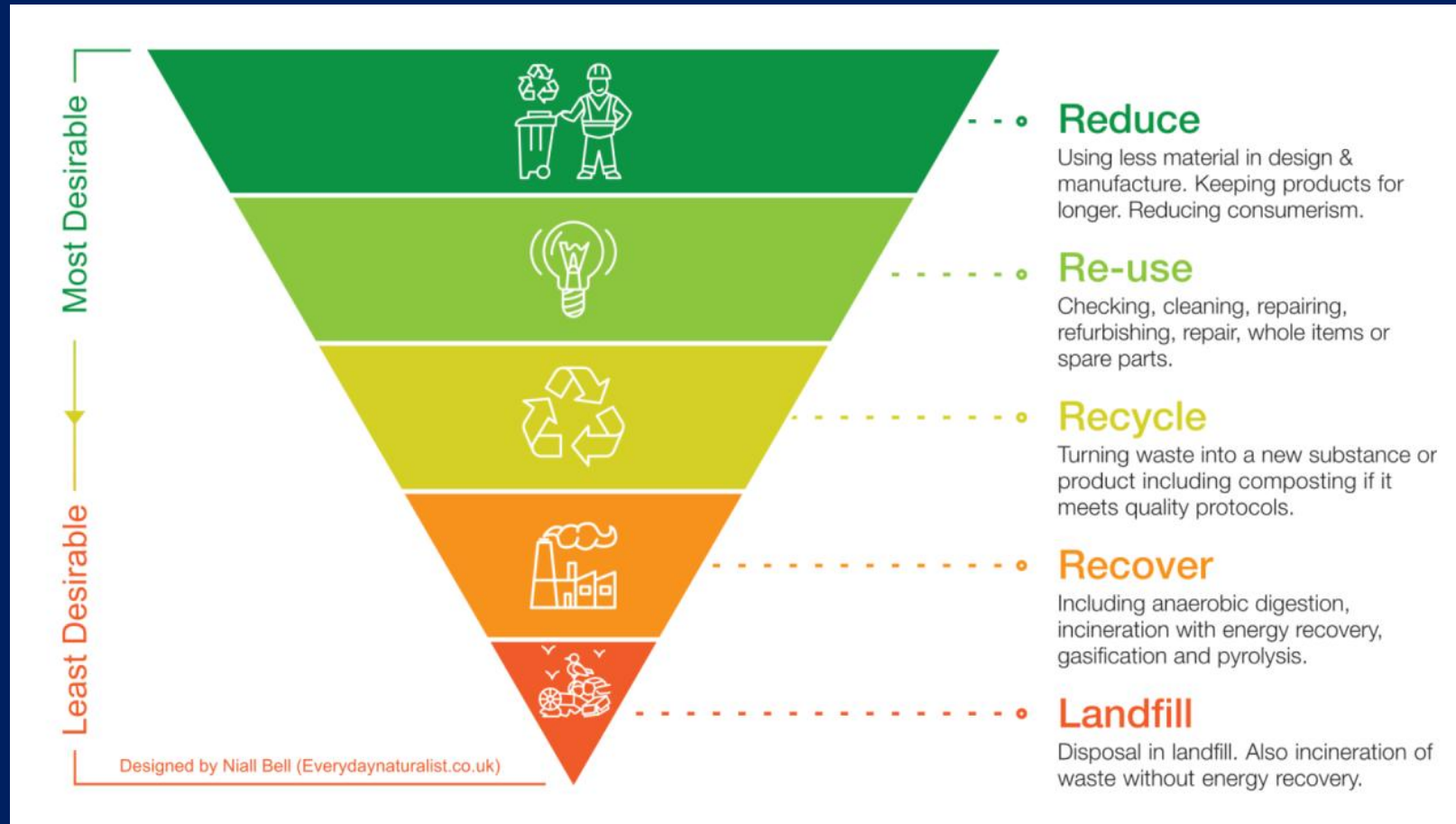


Hazardous Construction Waste

- Examples:
- Asbestos
- Contaminated soil
- Paints & solvents
- Oils & fuels
- Adhesives



Waste Hierarchy



Site Waste Management Planning (SWMP)

- Pre-construction waste forecast
- Waste audit
- Material optimisation
- Segregation zones

Why Site Waste Management Plan is Important in Construction?

- Construction projects are dynamic:
 - Multiple contractors
 - Constant material deliveries
 - Design changes
 - Time pressure
- Without planning, waste becomes:
 - Disorganized
 - Mixed
 - Contaminated
 - More expensive to dispose
 - Higher safety risk
- Poor planning leads to:
 - Increased accidents
 - Fire risks
 - Environmental incidents
 - Regulatory breaches



Storage Requirements

- Best practice:
 - Covered skips
 - Bunded areas for liquids
 - Secure storage for hazardous materials
 - Protection from rainwater runoff
- This will enhance:
 - Pollution prevention
 - Spill response planning



Why Storage is a Critical Control Point

- Waste storage is not passive — it is an active risk control stage.
- Most environmental incidents occur during:
 - Temporary storage
 - Handling before collection
 - Poor segregation
 - Inadequate containment
- This is why regulators, emphasise:
 - Proper containment
 - Clear labelling
 - Pollution prevention



Protection from Weather (Rain & Wind)

- Construction waste exposed to rain can cause:
 - Leachate formation
 - Cement washout runoff
 - Soil contamination
 - Blocked drainage systems
- Controls include:
 - Covered skips
 - Impermeable base
 - Drainage protection
 - Sheeting for light materials
- Windblown materials create:
 - Public nuisance
 - Reputational damage
 - Environmental harm
 - Extensive clean up



Fire Risk Control

- <https://www.youtube.com/watch?v=Zc4iEB-i4NQ>
- The 2006 Apex hazardous waste fire was a major industrial accident that occurred on the night of October 5, 2006, at the EQ Hazardous Waste Transfer Facility on Investment Boulevard in Apex, North Carolina, a suburb of Raleigh. The incident involved a series of explosions and a large, multi-day fire, resulting in the evacuation of approximately 17,000 residents (about half the town) and, as noted in reports, one of the largest such evacuations in the state's history.

Key Findings

- Emergency Inadequacies:** Responders did not have access to a list of the chemicals stored on-site, which significantly hampered emergency efforts.
- Regulatory Changes:** The incident led to tighter state regulations in North Carolina, including new requirements for fire protection, improved documentation for emergency planners, and minimum distance requirements between waste facilities and residential areas.
- Legal & Financial:** The Environmental Quality (EQ) company faced extensive fines (over \$553,000) and settled lawsuits for millions, ultimately agreeing not to rebuild the facility in Apex.
- Investigation:** The U.S. Chemical Safety Board (CSB) investigated the incident, with their final report highlighting the need for better hazardous waste storage management and improved emergency preparedness.



Construction Pollution Types

- Air (dust, fibres)
- Water (runoff, cement washout)
- Soil contamination
- Noise pollution



Air Pollution Control

- Controls:
 - Water suppression
 - Dust extraction
 - Covered loads
 - Wheel washing
 - Modern equipment / engines
- The above can be tied to health impacts:
 - Respiratory disease
 - Silica exposure



Water Pollution Control

- Controls:
 - Silt fences (temporary barrier made of fabric to control erosion)
 - Sedimentation tanks
 - Spill kits
 - Bunded fuel storage
 - Controlled washout areas

Soil Contamination Management

- Pre-construction site investigation
- Contaminated soil segregation
- Licensed disposal
- Remediation planning



Noise Pollution

- Control measures:
 - Working hours compliance
 - Acoustic barriers
 - Equipment selection
 - Communication with neighbours
- The above can be tied with:
 - Environmental nuisance
 - Community relations



Waste Risk Assessment Process

- Identify waste streams
- Assess hazards
- Evaluate risk
- Implement control measures
- Monitor & review



Identify Associated Hazards Examples

Example breakdown:

Waste Type	Hazard
Concrete	Manual handling injuries
Timber	Fire load
Plasterboard	Dust inhalation
Oils	Soil & water contamination
Asbestos	Respiratory disease
Packaging	Trip hazard

Evaluate Risks

- Assess:
- Who may be harmed?
 - Workers
 - Visitors
 - Public
 - Waste collectors
 - Neighbours
- How severe could harm be?
- How likely is it?
- Consider:
- Frequency of handling
- Exposure duration
- Proximity to ignition sources
- Weather conditions
- Example:
- Oil stored near drain →
Low probability but high environmental consequence.



Implement Control Measures

- Elimination: Reduce over-ordering, Avoid hazardous materials where possible
- Substitution: Use low-toxicity alternatives, Prefabrication to reduce offcuts
- Engineering Controls: Bunded storage, covered skips, fire separation
- Administrative Controls: Segregation procedures, waste handling training, scheduled removal
- PPE: Gloves, Respirators (if required), Protective Clothing



Monitoring & Review

- Monitor:
 - Waste accumulation levels
 - Storage conditions
 - Pollution incidents
 - Complaints
 - Fire load buildup
- Review when:
 - New waste stream introduced
 - Change in project phase
 - Incident occurs
 - Design changes



Integration with Fire RA

- Accumulated combustible waste increases:
 - Fire probability
 - Fire load
 - Evacuation risk
- Waste risk assessment should align with:
 - Fire safety plan
 - Emergency procedures
 - Site housekeeping policy



Financial Risk Consideration

- Failure in compiling waste risk assessment and housekeeping regime can result in:
 - Cleanup costs
 - Regulatory fines
 - Project suspension
 - Insurance implications
 - Reputation damage
- Risk assessment is also a financial protection tool.



Roles & Responsibilities

- Effective waste management requires clear allocation of responsibilities:
 - Client / Developer
 - Main Contractor
 - Site Manager
 - Environmental / H&S Officer
 - Subcontractors
 - Waste Carrier / Disposal Contractor
 - All Workers
- Waste responsibility cannot be transferred — duty of care remains with the waste producer.



Enforcement

- Waste audits
 - Recycling rate tracking
 - Incident reporting
 - Complaint monitoring
 - Performance benchmarking
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- Waste Management shall be considered as a measurable performance indicator



Key Takeaways

- Construction waste is predictable and manageable
- Poor waste control increases safety and environmental risk
- Planning prevents incidents
- Storage is a critical control point
- Pollution prevention must be proactive
- Risk assessment underpins control
- Accountability cannot be delegated

