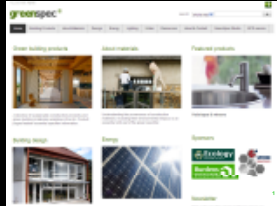


Waste Hierarchy

Ideals & reality
How many Rs in Recycling?
42 Rs so far



Waste Hierarchy 2011

EU and EA definitions &
implications

Another NGS GBE GBL CPD file to download

See <https://GreenBuildingEncyclopaedia.uk>

See <https://GBELearning.com>



Waste Hierarchy

Ideals & reality
How many Rs in Recycling?
42 Rs so far

15/11/2007 13:06

© NGS 2002-2006 Expanded Waste Hierarchy

1

Waste Hierarchy new definition

Rethink, Re-educate, Resolve, Refocus,
Resource, Relate, Research, Refer,
Refresh, Rename, Regard, Revalue,
Remeasure, Reprogramme, Replan,
Reconsider, Refuse, Reject, Return,
Redesign, Regularise, Rehearse,
Rationalise, Remediate, Reduce,
Reserve, ReSpec, Register, Reuse,
Reclaim, Repair, Retain, Remind,
Recycle, Recover, Record, Report,
Reward, Review, Revise, Refine,

Waste Hierarchy Effort
official definition & goal

Reduce More
Reuse
Recycle
Recover Less

Waste Hierarchy Effort
The reality

Reduce Less
Reuse & Recycle
Recover
Reject More

Effort

Waste Hierarchy

official definition & goal

Reduce

More

Reuse

Recycle

Recover

Less

Ideal Waste Hierarchy

- Reduce
 - Reduce demand, reduce waste
- Reuse
 - As originally intended
- Recycle
 - In a new format
- Recover
 - materials or energy from waste

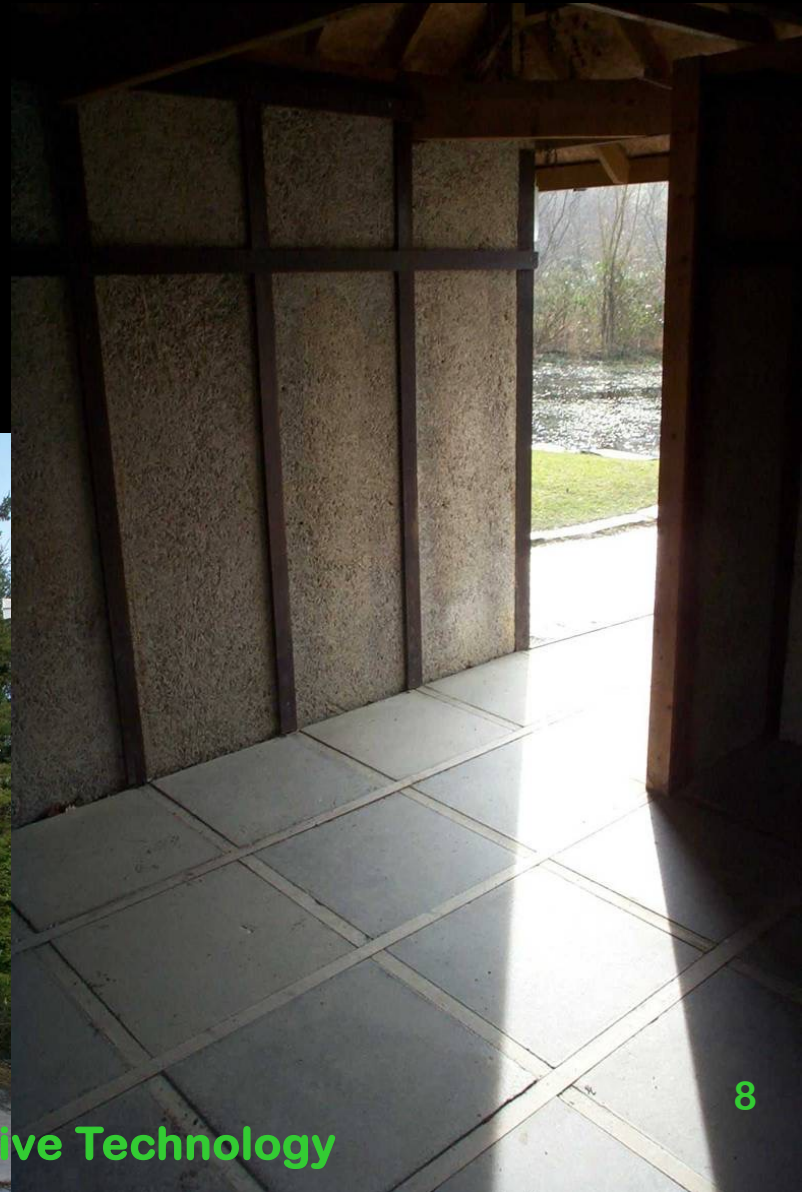
Reduce:

Modular design wastes less

Allows reuse readily

- Walter 'Segal Method'
- Whole component used full size no cutting

Robin Hillier Diggers
Self-build Brighton



Reclaimed repaired
Reused and reusable

Recycled steel
frames
Redundant bolt
holes
Blast clean and
prime/paint





BedZED Beddington Sutton Architect: Bill Dunster
Reclaim: BioRegional ReCLAIMED **© NGS**



Reused wood better than new

BedZED Beddington Sutton Architect: Dr Bill Dunster,
Reclaim: BioRegional ReCLAIMED ©



Reclaimed, repaired & reused Doors



Reusing Doors
Visible Patch
repairs
If you don't like
them French
polish or paint
them



BedZED Beddington Sutton Architect: Bill Dunster
Reclaim: BioRegional ReCLAIMED © Nicole Lazarus

Recycle: Glass sand for bedding



Effort

Waste Hierarchy

The reality

Reduce

Less

Reuse & Recycle

Recover

Reject

More

Reality Waste Hierarchy

- Designers do little if any to Reduce demand for Resources
- General Constructors not engaged in reuse
- General Constructors Recycle very little
- Recovery by site composting unheard of
- Recover Energy: Site fires waste energy; now scarce
- General Constructors habitually Reject surplus to requirements to Landfill as first choice, treated as waste

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Long Waste Hierarchy

Short Definition

- Rethink: forget everything you know and start again from scratch
- Re-educate: the whole industry
- Resolve to make a difference in the changes implemented
- Refocus to address resource efficiency throughout design and construction and not just focus on waste minimisation after it

Long Waste Hierarchy

Short Definition

- **Resource** the task with the right number and quality of people to carry out the tasks in hand
- **Relate**: build supply chain relationships to drive down waste
- **Research**: alternative avenues
- **Refer**: to authoritative information sources
- **Refresh**: list of supply chain partners
- **Rename**: 'Waste' as 'Resource'
- **Regard**: 'Waste' as 'Resource'

Long Waste Hierarchy

Short Definition

- Revalue: Use NGS GreenSpec WasteCost® calculator to put resale value on the waste and determine the potential savings from waste segregation
- Re-measure to avoid over ordering
- Re-programme to make time to do it
- Re-plan the site to facilitate resource efficiency

Long Waste Hierarchy

Short Definition

- Reconsider all design decision in SWMP
- Refuse unnecessary or all packaging
- Reject defective material
- Return defective materials, packaging and protection to supplier
- Redesign to reduce waste
- Regularise the size of materials towards dimensional co-ordination

Long Waste Hierarchy

Short Definition

- **Rehearse to Resolve:** use full scale mock ups and control sample
- **Rehearse:** practice runs to site for JIT
- **Rationalise deliveries from a Consolidation centre on JIT milk round**
- **Remediate:** mechanical or bioremediation insitu don't export

Long Waste Hierarchy

Short Definition

- Reduce quantity of materials, energy, packaging, etc. used and wasted
- Reserve the natural materials you will approve, don't condemn finished work
- Respecify to reduce rejects
- Register: for licences and waivers
- Reuse off-cuts in the works
- Reclaim second hand materials for use in project's materials





This house
only uses
reject floor
boards
from too
high a
spec

Long Waste Hierarchy

Short Definition

- Repair: reclaimed and reuse in works
- Retain spare materials on site for use in occupied building
- Remind people why resource efficiency is important, run toolbox talks, posters
- Recycle materials from remaining waste
- Recover materials or energy from remaining waste

Long Waste Hierarchy

Short Definition

- Record opportunities to improve in a wish-list
- Report: on waste statistics KPI and EPI
- Reward: best practice
- Review past project wish-lists
- Revise methods on next project
- Refine and improve every time
- Recycle knowledge gained
- Restart: return to start with new knowledge and make it better next time

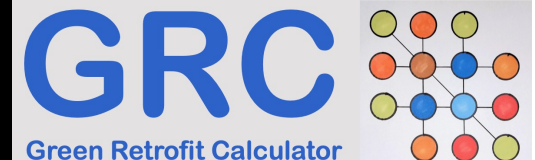


<https://GreenBuildingEncyclopaedia.uk>



Green Building Calculator

<https://GreenBuildingCalculator.uk>



Green Retrofit Calculator

<https://GreenBuildingCalculator.uk>

Waste Hierarchy

Principles of Waste
Management/Minimisation
Expanded Waste Hierarchy

Effort

Waste Hierarchy

official definition & goal

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More

Reuse

Recycle

Recover

Less³⁰

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Recover Energy (Incinerate)

- Site fires waste the resources & energy
- Fires on sites for all timber, cardboard, packaging, paper, pallets
- Site fires burning plastics high polluters
- Some domestic waste is incinerated to generate electricity or heat
- Rubber tyres are being reduced to a high calorific value fuel in Cement Kilns to reduce CO₂ emissions

Recover Materials

- Recover nutrients for reuse
- On-site composting of green landscape waste
- Manufacture topsoil on site
- Compost + Subsoil = topsoil
- Use on site, do not export to landfill and do not import new

Reject (Landfill)

- Where only the last few bits are left that cannot be put to other use
- In reality much goes there by default

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Rethink

- Forget everything you know and start again from scratch, culture change ahead
- Run SWMP workshops and SWMP checklist to facilitate culture change
- Reconsider site and its resources, anything existing, design, specification, materials, packaging, storage, protection etc. to avoid Waste
- Strive for site autonomy: no export, no import

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Re-educate

- Re-education of the whole industry is essential
- College knowledge is not enough
- Subjects: sustainability, resource efficiency, waste minimisation and management in particular

Relearn some waste statistics

- 90mtonnes/year waste from UK CI
- 13m tonnes/year (18%) over ordered never needed
- 22m tonnes/year (24%) is packaging
- 33% is materials off-cuts
- 10.3% is temporary materials
- 23.7m tonnes/year (33%) soil & rock

Relearn some waste statistics

- UK CI generates hazardous waste:
- 5m tonnes/year 50% is landfilled
 - (New rules this grows to 7m tonnes/year)
- 21% of all UK Hazardous waste
- Of 240 hazardous waste landfill sites only 10 (2004) signed up to new rules
- None in London, Scotland and Wales
- Sites in MK, (Swindon), Teeside & Pboro

Relearn some waste statistics

- There is a fly-tipping incident every 35 seconds in the UK
- 1 m Fly-tipping incidents in 2004
- 6000 20t trucks within M25 in 15 months
- CI: 30% of fly tipping incidents (2004/5)
- £44m/year clean up costs
- £50,000 fines and 5 year prison possible

Relearn some waste statistics

- Packaging waste can vary between 5% and 50% (24% average) of waste stream depending on construction method

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Resolve

- Resolve to make a difference in the changes implemented
- Resolve to improve performance
- Resolve to use resources efficiently
- Resolve to improve profit margins

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Refocus

- Refocus to address resource efficiency throughout design and construction
- Refocus not just on waste minimisation after design and construction

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Resource

- Resource the task with the right number and quality of people to carry out the tasks in hand
- Non-English natural tongue labour from poorer background are naturally resourceful people
- Given the opportunity will be natural waste champions

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Relate

- Build supply chain relationships to drive down waste
- Partnering offers an opportunity to share the savings achieved
- Works together through SWMP workshops with demand and supply chains working in harmony!
- Communicate through toolbox talks

Relate

- Build relationships with the Environment Agency don't make enemies
- Don't see them as the police
- Use their expertise especially in emergencies
- They will work with you to solve problems
- Don't get fined for being wrong

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Research

- alternative avenues in resource efficiency
- NGS is exploring opportunities for joined up thinking in waste management
- Companies offering alternatives to 'business as usual'
- NGS Specifications have some answers
- NGS Appendix have the companies

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Refer

- Refer to authoritative and current information sources
- Environment Agency NetRegs website for up to date legal and environmental information with a construction focus
- Envirowise, WRAP, BRE, NGS, HazRed, CIRIA, CE, etc.

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Refresh

- Refresh lists of supply chain partners
- Replace with radical thinkers
- Those offering added value
- With real solutions not greenwash
- NGS has some listed in its Appendix

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Rename Waste

- Rename Waste as a Resource to manage and reduce and not waste
- Rename Waste as a Resource to Reclaim, Reuse, Recycle or Recover
- Rename as Demolition Arisings to Reclaim, Reuse, Recycle or Recover
- Rename Waste as Excavation Arisings to reuse or recycle

Rename Waste

- Awaiting new Guidance from EU and EA on Waste Definitions
- Reduction in the number of special Licences or waivers required to handle materials
- E.g. on site landscape modification arisings chipping and handling requires permission

Rename an Enthusiast(s)

- As “Waste Champion”
- Give the enthusiast Authority and responsibility to drive down waste occurrences
- Tower crane driver sees everything
- Dumper driver goes everywhere
- Quarter master controls over ordering

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Regard

- Regard 'Waste' as:
- 'Resource'
- 'Demolition Arrising'
- 'Excavation Arrising'
- 'Surplus to requirements' of this project
- 'Spares' for on going maintenance

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Revalue

- Use NGS GreenSpec WasteCost® *lite* waste cost and segregation saving calculator
- Determine costs of waste segregation
- Determine savings from waste segregation
- Determine the costs of the wasted materials
- Determine Resale value of the Reclaimables
- Determine potential KPI and EPI figures
- Determine embodied energy in the wasted

Microsoft Excel - WasteCostLite(R)W.xls

File Edit View Insert Format Tools Data Window Help Adobe PDF

Type a question for help

85%

B

Reply with Changes... End Review...

Arial 10

© 2005 NGS GreenSpec WasteCost® lite

INPUTS

1 Number of buildings 0 No.

Building Footprint 0 m2

Number of floors 0 No.

2 Choose a construction type closest to your project

Average (All building types) Yes Type Yes in only one cell

Average (Offices) No

Average (Residential) No

Innovative MMC Prefab Housing No

Steel and Glass Office No

Make sure No appears in the remainder

OUTPUTS

7

Cost of one skip system of mixed waste removal £0.00

"Waste segregation will cost more money" £0.00

Revised cost of reduced one skip mixed waste system £0.00

"But look how much it can save!" £0.00

Predictable Volume of waste generated on Project 0 m3

Volume potentially diverted from landfill 0 m3

Volume diverted with chosen waste streams 0 m3

Predictable weight of waste generated on project 0.00 tonnes

Weight of waste potentially diverted from landfill 0.00 tonnes

Weight diverted with chosen waste streams 0.00 tonnes

Potential % diverted from landfill (by tonnage) 100%

3

Potential Waste Segregation/Reclaim & Reuse/Recycling Streams

WAS+ICE Colour system

No Segregation (Mixed incl. Hazardous) Yes

Inert No

Mixed metal No

Mixed (non Hazardous) No

Timber No

Packaging No

Compactable No

Plasterboard No

Hazardous No

Add Yes or No in each cell to indicate which

1

Total number of waste streams proposed for contract

4

Add or replace rates with local collection rates £/tonne

£15.00 £/tonne

£25.00 £/tonne

£75.00 £/tonne

£25.00 £/tonne

£15.00 £/tonne

£15.00 £/tonne

£25.00 £/tonne

£600.00 £/tonne

Local waste collection rates £/tonne

5

Number of 8 CuYd skips for each waste stream

0 No.

0 No.

0 No.

0 No.

0 No.

0 No.

0 No.

0 No.

0 No.

0 Total

Total number of 8 Cu Yd skips

6

Potentially Reusable or recyclable m3

0 m3

0 m3

0 m3

0 m3

0 m3

0 m3

0 m3

0.0000 m3

0 Total

Potentially Reusable or recyclable m3

Mouse over & read

78

Revalue: True Cost of Waste

- 8 cu yd skip
- Skip hire: £85
- Labour to fill Skip: £163
- Cost of materials put in skip: £1095
- Total cost: £1343
- Hire cost: total cost 1:16
 - Amec Study

Revalue

- £308 m paid by UK CI on Landfill tax alone (2006/07)
- 85% of constructors not interested
- 15% constructors discovered cost savings

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Re-measure

- Re-measure to avoid over ordering
- Reduce % of slack to the minimum
- QS's +/- 10% accuracy is potentially wasteful
- 5% (varies with each material) excess for damage replacement is excessive
- Re-measure on site and pay for what is installed encourages waste reduction
- Re-measure to include spares handed over

Re-measure

- Reclamation Audits, Pre-demolition or Pre-alteration Audits allow the Employer and Design team an opportunity to reconsideration of the existing buildings on site
- Quantify what you have before you start
- Determine what can be reused
- Demolition Protocol calls for it
- T&C Planners will demand it

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Re-programme

- Re-programme to ensure that any existing buildings can be pre-demolition/alteration audited
- Re-programme to allow soft strip and deconstruction before demolition
- Re-programme to remove time pressures from the demolition team

Re-programme

- Re-programme with the Employer on board
- Re-educate the Employer
- Re-programme to avoiding Employers ridiculously ambitious programmes
- Re-programme: include SWMP, make sure the Employer takes responsibility for their actions in respect of resource efficiency

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Re-plan

- Re-plan site layout for efficient flows
- Organise incoming: inspection then straight to use or storage
- Accessible weatherproof, flat, drained conditioned storage
- First in > first out to use in building
- Excess, waste and packaging: near exit



Waste Hierarchy

new definition

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Reconsider

- Reconsider the whole design to seek out resource efficient methods and materials

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Refuse

- Refuse excess packaging
- Under the Packaging Producer Responsibility Act the manufacturer is responsible for dealing with waste packaging (subject to size of business)
- either directly or by others at their own expense
- Require them to Remove it or collect it later, collect it to enable easy Return

Refuse

- Supply chain management:
- Partnering can offer opportunities to demand a better service from manufacturers and suppliers:
- Reduce packaging (within reason)
- Reconsider pallet packing for stability
- Require adequate protection & no more
- Return of all packaging to source



Refuse

- Refuse to excavate contaminated soil and move it around the country to Hazardous Waste Landfill
- Remediate insitu: Bio: 3yrs, Mech: quick
- Reduce Hazard level
- Refuse to excavate clean subsoil and send to landfill
- Search out opportunities: Reuse on site

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Reject

- Ensure all deliveries are checked as 'Fit for Purpose' & 'of Merchantable Quality'
- Reject any defective materials
- Return them to the manufacturer to
- Replace defective materials with new
- Manufacturer to Refurbish and Resell
- Reuse, Recycle or dispose
- Packaging must be partially Removable to permit inspection & be Replaceable ⁹⁸

Reject

- Materials hazardous to manufacturer, fabricator/applicator, user, occupier, recycler, dismantler, landfill operator
- Materials which will be Reclassified as hazardous waste, that will be expensive to Reduce hazard level
- Materials which are difficult or expensive to dispose of or landfill

Reject

- If you run a JIT delivery system to a tight urban site where deliveries are scheduled
- Reject late or out of sequence deliveries
- Reschedule to another day
- Get delivery drivers refocused to rehearse routes to ensure JIT delivery is possible

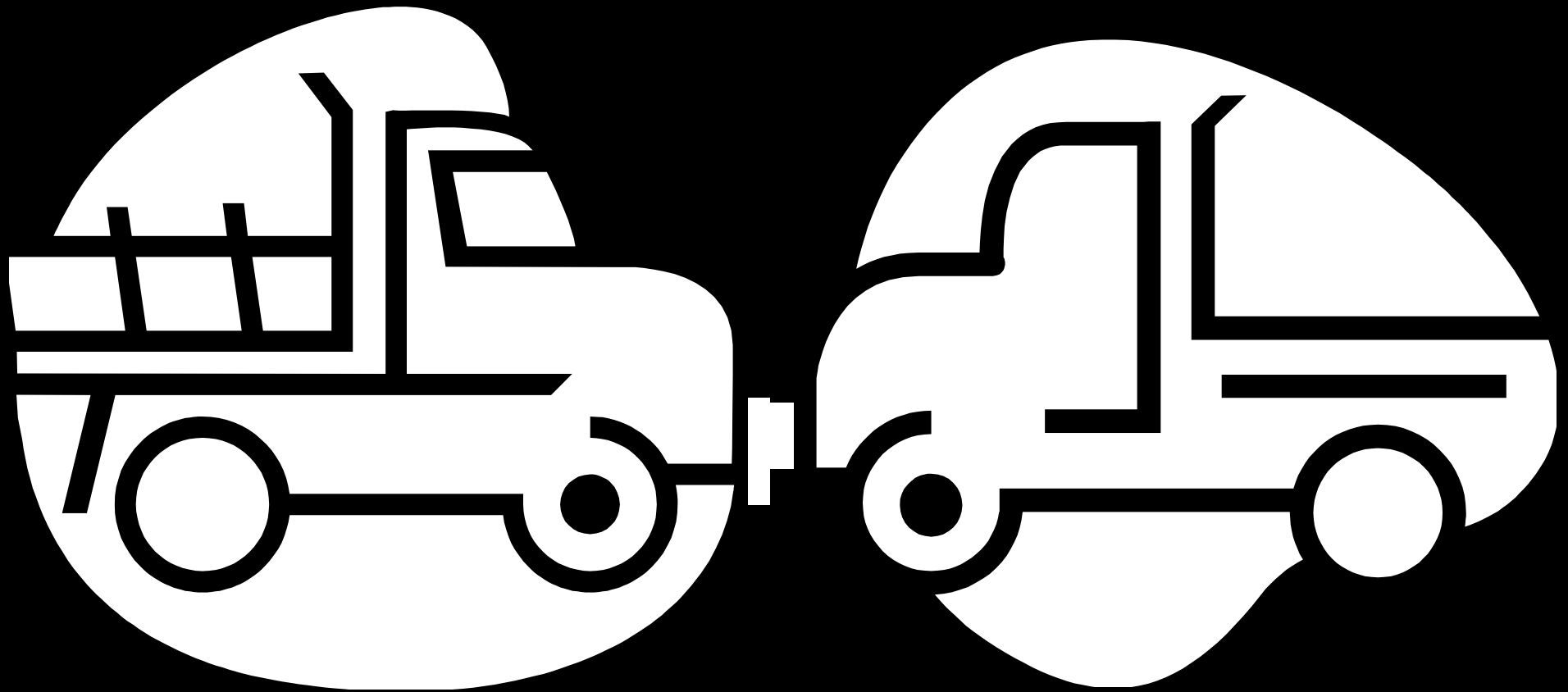
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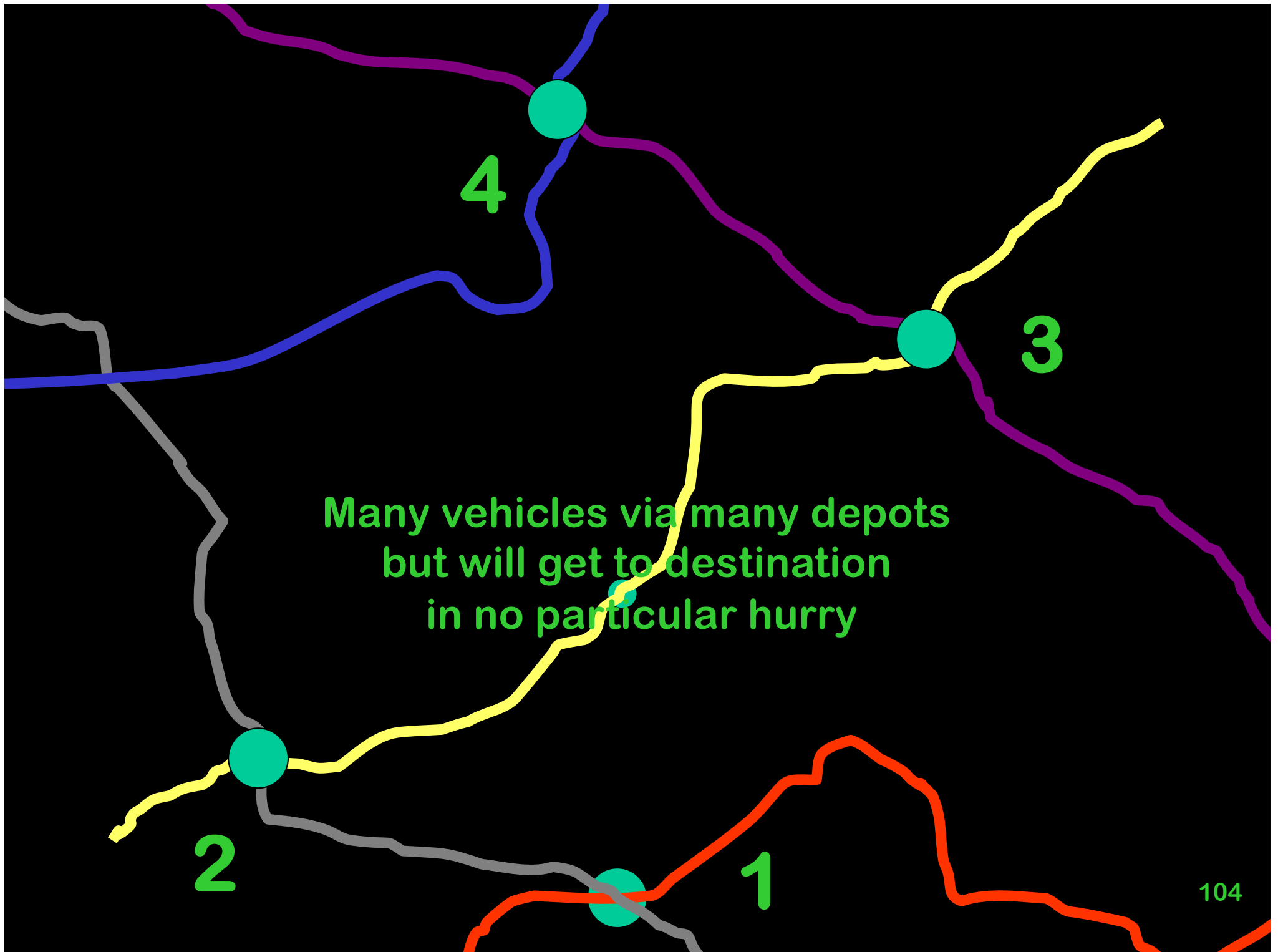
Return

- ‘Sale or Return’ ensures over ordered and unused materials can be taken back into stock if still of merchantable quality
- India has a 45 day return period
- ‘Take-back schemes’ provide waste containers, sacks or skips for collection of offcut scraps and Return to manufacture to Reuse as Raw materials



Couriers: offer take back scheme

For every laden truck in a hurry there is an unladen one coming back
Couriers offering a slow return to manufacturer service, cheap but not free



Fleet of small
vehicles short
distance to hubs

Fully laden heavy
vehicles
between hubs

Fleet of small vehicles
short distance to final
destinations

Pallet Services



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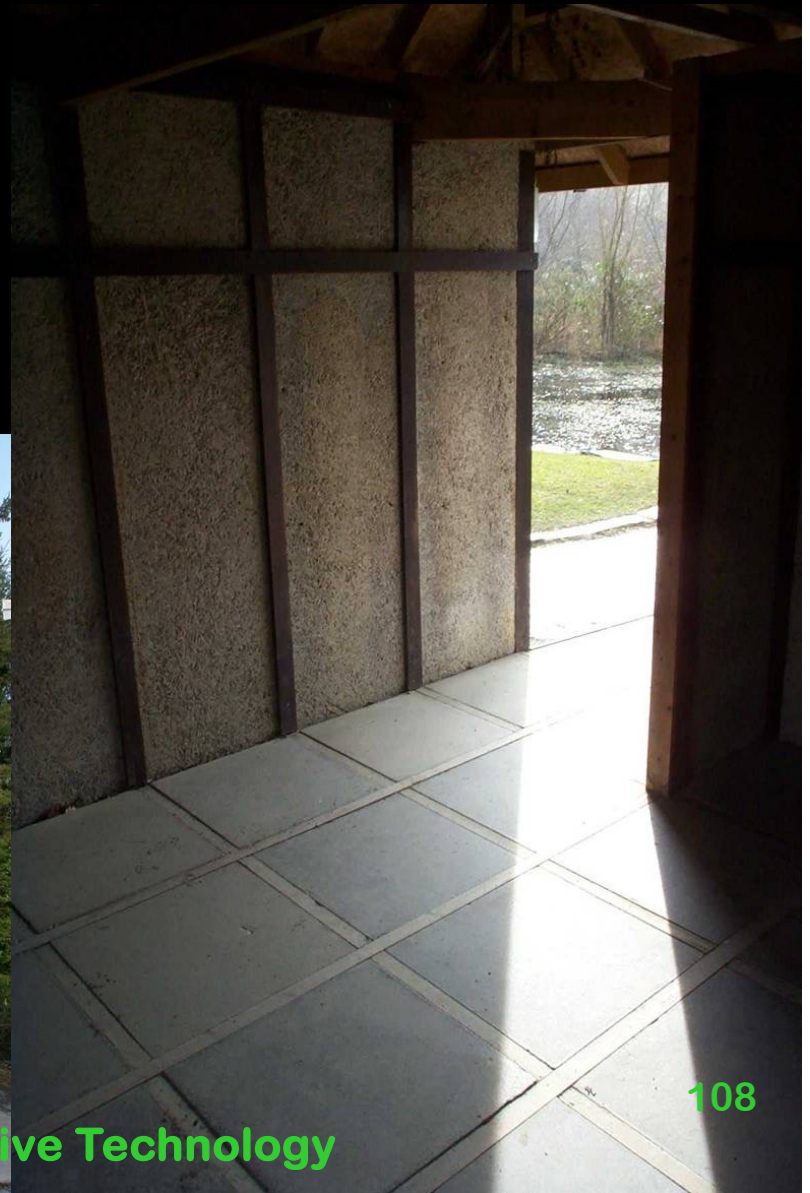
Redesign to Reduce

- Reduce off-cuts by designing to manufactured sizes
- Walter Segal's 'Segal Method' used 8x4 sheets and 4x2 and 8x2 timbers
- Virtually no waste
- only cutting to length and drilling

Modular designs waste less

- Walter 'Segal Method'
- Whole component used full size no cutting

Robin Hillier Diggers
Self-build Brighton



Redesign to Reuse

- Redesign methods of assembly to allow disassembly
- Redesign fixings and fastenings
- Clamp, bolt, screw
- No Welding, nails, adhesives
- Redesign to be robust enough to survive dismantling handling transport and reassembly

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Regularise

- Dimensional Co-ordination is good
- If products are made to required sizes
- Too many are different
- Regularise on 1200 x 2400 mm. ?
- Regularise on 600 x 600 mm. ?
- And sub-modules

Regularise

- Just because CAD can do you really need to?
- Rediscover the right angle
- Avoid overlapping angled grids & waste
- Avoid controlled chaos
- Maintain some consistency
- Avoid waste in design

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Rehearse

- Use mock-ups to discover difficult parts to assemble and risks of damage or waste arising
- Test the assembly sequence and discover the clues to the Chinese puzzle
- Relay the sequence to site so they do not have to Repeat the learning process

Rehearse

- Sample, Prototype, Mock-up, Test-rig
- Check junctions, tolerance and design intent
- Refine design before mass production
- Approve quality before making many

Rehearse

- JIT Deliveries to avoid failure
- Traffic conditions
- Route to site(s) or milk Round
- Pallet content for JIT delivery of days requirements

Waste Hierarchy

new definition

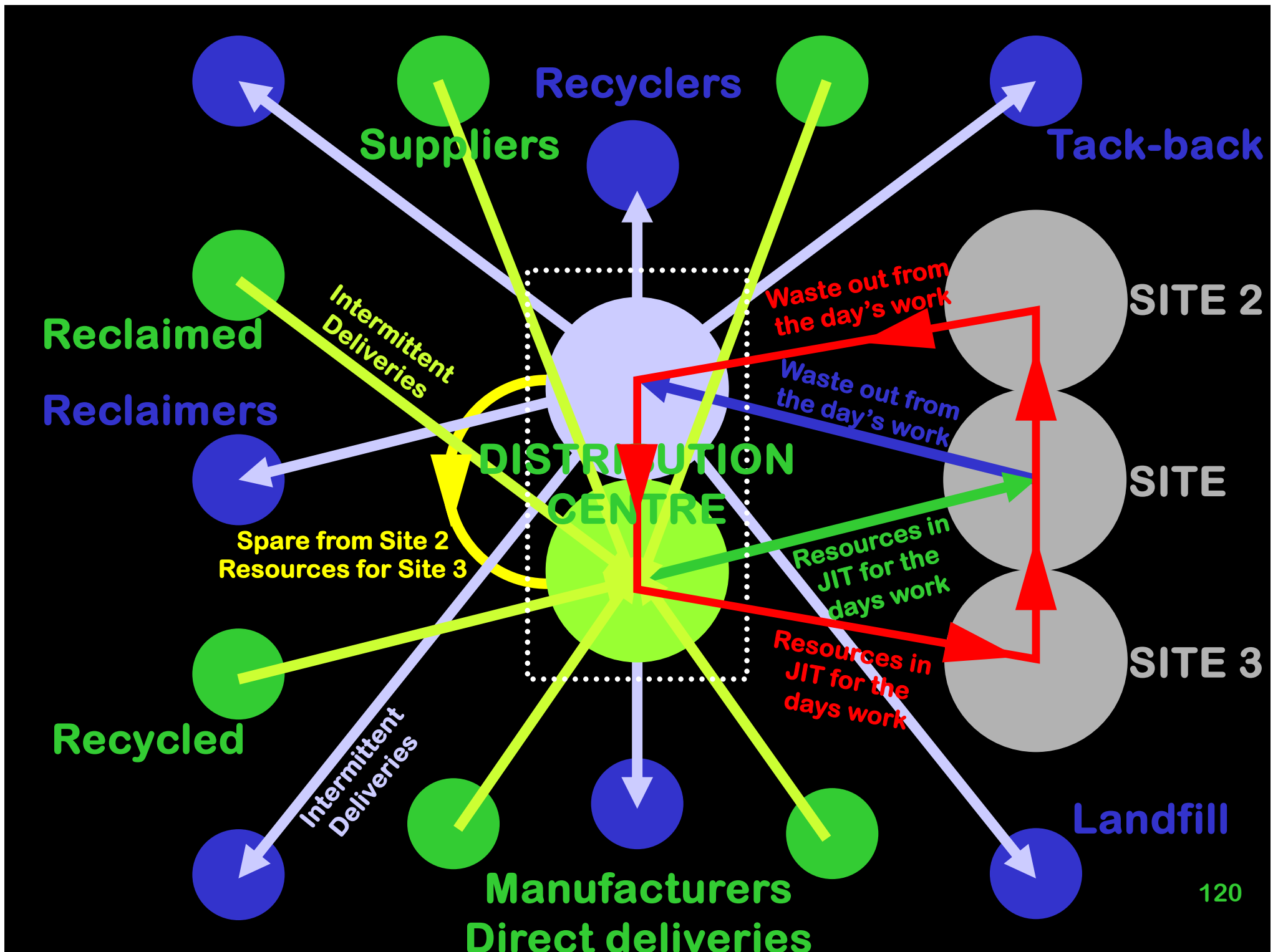
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Rationalise

- Use Construction Consolidation Centre
- Rationalise big deliveries to CC Centre
- Small deliveries from Centre to site(s)
- Reduce traffic congestion on route and on site, Reduce emissions
- Retain 'over-ordered' for more sites
- Return 'excess to Requirements' to CC Centre for reuse in next delivery/site

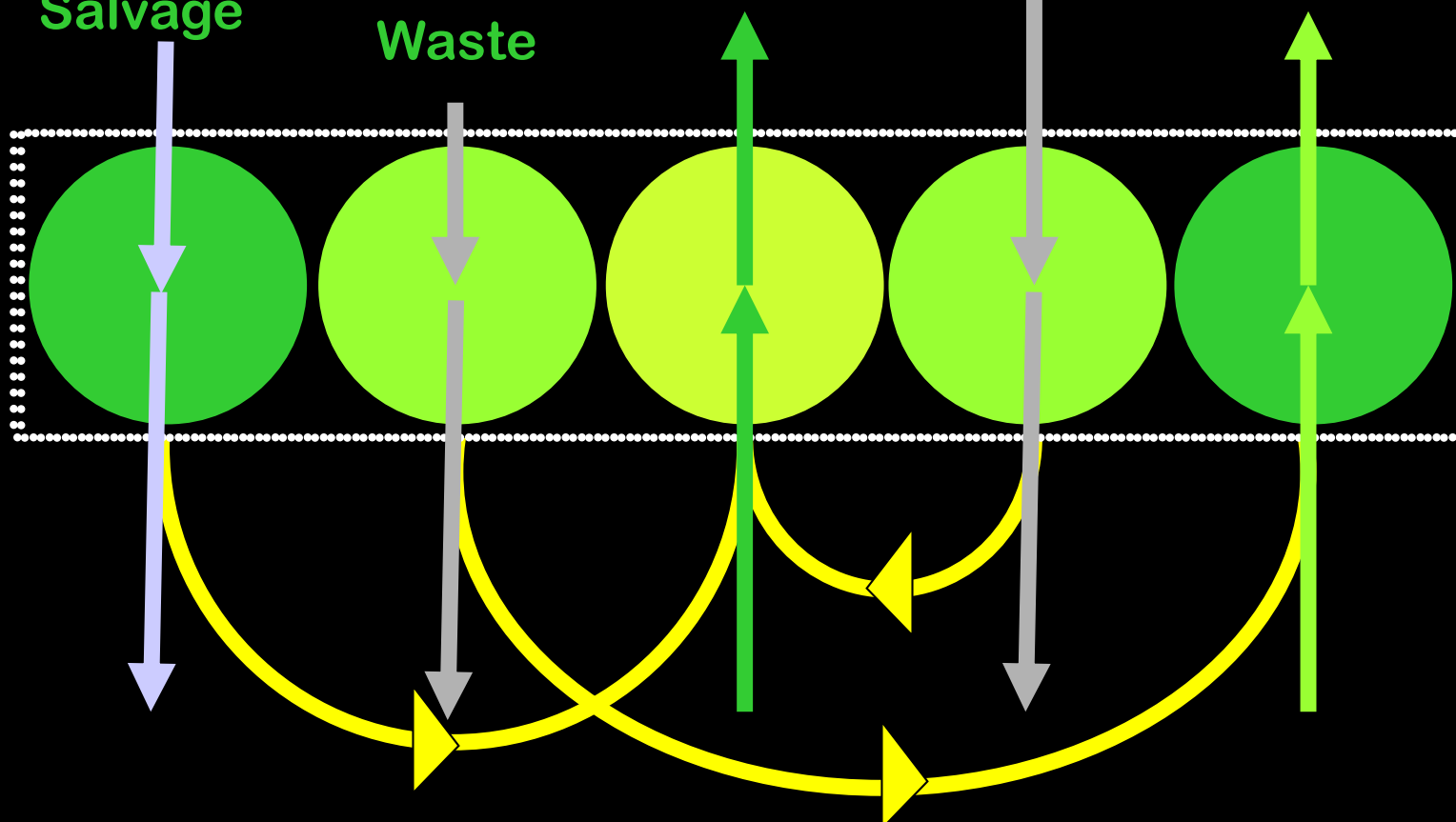
Rationalise Delivery Schedule

- Plan next day's requirements
- Order in advance by call off schedule
- Deliver daily requirements JIT
- Deliver with all fixings and fastenings
- Deliver to within 5m of labourers
- Deliver without packaging
- Deliver without damage



CONSTRUCTION / ALTERATION SITE

Soft strip Demolition Alteration Arisings Architectural Salvage
Site Clearance Excavation Arisings Landscape Green Waste
New Construction Materials Inbound
New Construction waste outbound
New Landscape Materials Inbound



MANUFACTURERS/SUPPLIERS

Waste Hierarchy

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Remediate

- Remediate brownfield sites insitu
- Bio-remediate with plants to extract chemicals and recycle if you have 3 years
- Mechanical/chemically remediate if you have room and access and some time
- Remediate off site to reduce hazard level before landfilling

Waste Hierarchy

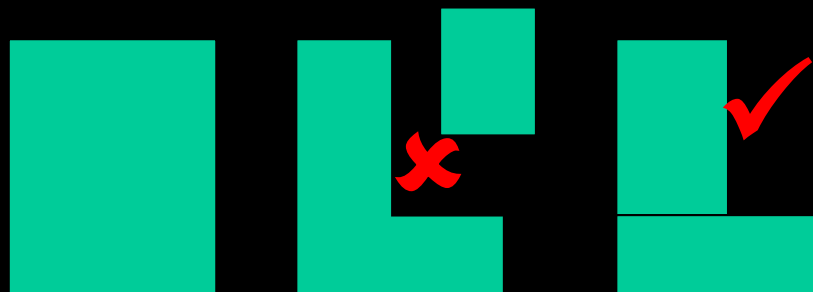
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Reduce Demand



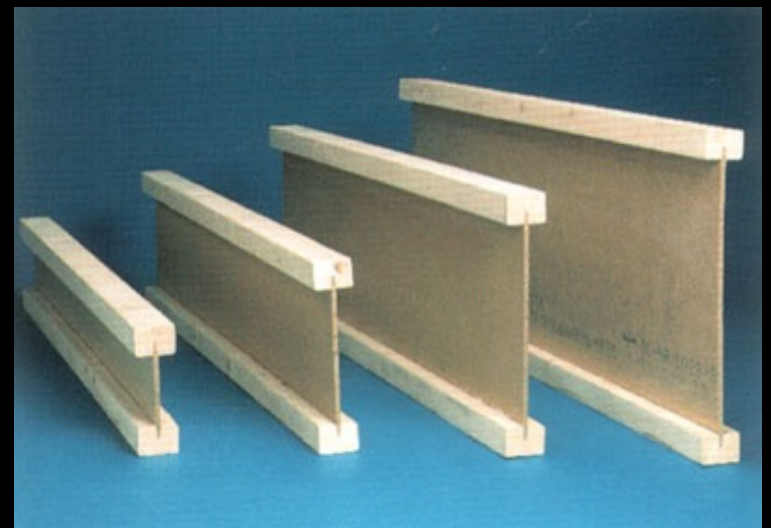
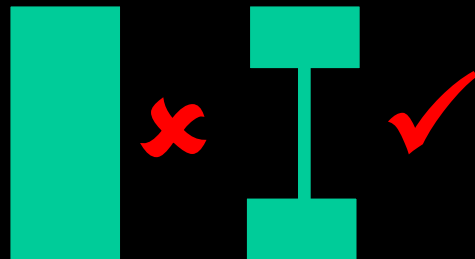
- Don't over design structure
- Except if long design life demands it
- Don't oversize
- Don't cut section from solid if compound is possible



Reduce Demand



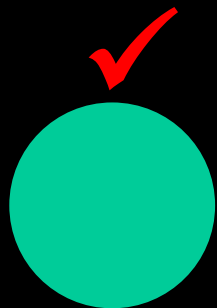
- Don't cut section from solid if compound is possible
- Reduce solid sections to compound to reduce materials used
- Reduce weight and transport emissions



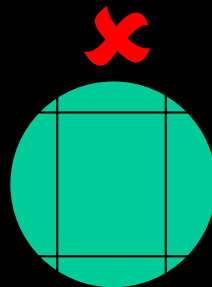
Reduce Demand



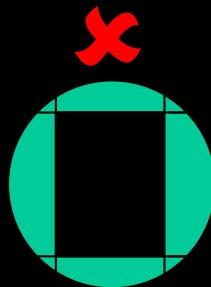
- Consider use of materials as found:
- Round pole structures
- Or compound sections without waste
- Or use off-cuts in cladding



Roundwood
Reassemble



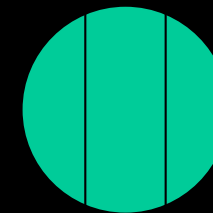
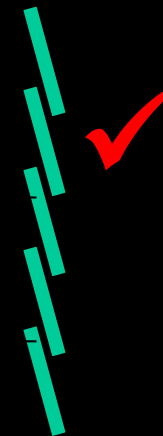
Cut



Waste

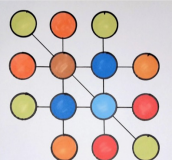
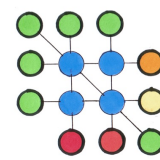


Wood Boarding



Cut





Reduce Hazard Level

- Review the EWC European Waste Catalogue for materials Reclassified as hazardous
- Determine WAC Waste Acceptance Criteria of Landfill sites
- Treat Hazardous Waste to Reduce the hazard level before going to landfill
- Bio-Remediate insitu if possible

Reduce

- Reduce over order % from industry default % (5 – 10%) towards zero %
- Reduce reliance on JIC Just In Case
- Move towards JEM Just Enough Materials and JIT Just In Time
- Reduce packaging
- Reduce quantities to Landfill

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Reserve

- Reserve natural materials with natural variations to demonstrate intent
- Reserve logs don't condemn finished joinery
- pReview natural materials with large or numerous samples
- Set acceptable upper and lower limits

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ReSpecify to Reduce Rejects

- Consider lowering standards to reduce rejection rate
- Natural materials have natural variations:
 - select logs don't reject final products
 - Quality rejects or offcuts from "for sale" might go into "for rent"
 - damaged face used in hidden face

Slate production

- For every tonne of slates created
- 100 tonnes of waste
- Welsh use explosives
- China and Spain cut from solid block
- Cheap slate competes with Welsh
- Specify Local if possible



Reject: Slate natural variation

- For every tonne of slates created
- 100 tonnes of waste (welsh practice)
- and more when we are selective
- We need to accept natural variation in natural materials



ReSpecify avoiding Hazardous

- Avoid materials hazardous as waste and probably hazardous as materials
- Respecify using natural material
- Respecify using mineral based material
- Respecify avoiding Synthetic materials
- Respecify avoiding CHIP transport risks
- Read the COSHH and CDM data sheets
- Remove Risks from labourers

ReSpecify with NGS

- NGS GreenSpec Waste Preliminaries
- A38 Construction Resource Management/Waste Minimisation
- C20 Demolition/Deconstruction Resource Recovery
- C91 Alteration: Resource Recovery/Waste minimisation
- And their Appendix

ReSpecify with NGS

- NGS GreenSpec Waste Preliminaries
- Soon to be added
- A39 Packaging Efficiency Waste Reduction
- D20 Excavation Resource Recovery/ Waste Minimisation
- Q29 Landscape Waste minimisation
- And their Appendix

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Register

- Register early for licences and waivers likely to be needed on the project
- Register to enable all reclaim, recycling, recovery, removal, reuse,
- Register the site as a generator of waste, hazardous waste, etc.
- Register the Contractor and trade or sub-contractors
- Register the vehicles? drivers?
- Check the Registers for currency of the licences of waste handlers

Registration

- Early registration and reservation of chosen materials
- Include Registration details in specification clauses

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Reuse

- Reuse Formwork to minimise waste from temporary materials
- Use steel formwork in preference to ply
- Reuse Site Hoardings to minimise waste from temporary materials
- Use proprietary steel hoardings or fencing in place of ply and softwood

Why use hoardings once?



Timber is a renewable material which could be sustainable

- Except if it illegally logged,
- Except if it is temporary works and thrown away after the job is finished
- Hazardous, synthetic adhesive & paints
- Some will be battered and be skipped but most could be reused
- But one project end and another project start don't always coincide

Reusable steel hoardings



Steel is less sustainable than timber

- But reusable steel site hoarding makes more sense
- Some may get battered and be skipped but most will be reused on the next job
- And the next and the next
- They are thin and lightweight easy to store

Reusable steel fencing



Reuse

- No changes occur to the materials
- Reuse in exactly the same form
- Bricks Reused as bricks (lime mortar removed)
- Doors Reused as doors
- Steel sections Reused as Steel sections (bolt holes are redundant)

Reclaimed repaired reused

Recycled steel
frames
Redundant bolt
holes
Blast clean and
prime/paint



BedZED Beddington Sutton Architect: Bill Dunster

Reclaim: BioRegional ReCLAIMED

© NGS



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Reclaim for reuse

- Salvage and Reuse of demolition and construction materials
- Methods of assessment or test of materials (Recent seminar, Guide soon)



Reused wood better than new

BedZED Beddington Sutton Architect: Dr Bill Dunster,
Reclaim: BioRegional ReCLAIMED ©



BedZED Beddington Sutton Architect: Bill Dunster
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Repair and Reuse

- Repair or patch and Reused as original
- Doors
- Windows
- Fire place surrounds
- Kitchens
- Bathrooms
- Retread tyres

Reclaimed, repaired & reused Doors



Reusing Doors
Visible Patch
repairs
If you don't like
them French
polish or paint
them



<https://GreenBuildingEncyclopaedia.uk>



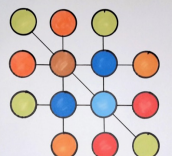
Green Building Calculator

<https://GreenBuildingCalculator.uk>



Green Retrofit Calculator

<https://GreenBuildingCalculator.uk>



Repairs with Traditional Materials

Conservation Quality Refurbishment



Reading Oracle Site 2-4 London Rd. 7 Bridges Hs. Architect: Haskoll & Co. 1



Visible repairs required by CO

Reuse of salvaged essential

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Retain

- Retain repair and reuse buildings

Retain & Repair Ordinary buildings with townscape importance





Retain landscape waste

- Retain biodiversity of existing site
- Retain seeds, plants, wild turf, topsoil, subsoil,
- Retail all tree, bush and shrub cuttings, grass and leaves
- Recover: Compost all green waste
- Recycle: Manufacture topsoil from compost and subsoil

Retain for Reuse/Repair

- Retain unused materials for:
- Snagging at end of job
- Defects Liability Period Repairs
- Employers FM in maintenance/repair
- Sheets of flooring from same batch
- Pots of paint from same batch
- Spares for components



Visible repairs over long life

Retention of excess to requirements is essential

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Reminder: Disadvantage

- If work is re-measured by QS on site and only materials installed are paid for
- No incentive to hand over spares except if a specified and billed item
- Architects must specify it to ensure it is billed and handed over

Remind:

- Remind all of the objectives for the site with resource efficiency and waste minimisation
- Rerun Toolbox talks
- Poster campaign on the Canteen, Welfare facilities, corridors, offices
- Remind people we are doing our bit for the planet and our grandchildren

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Recycled

- Properties of material do not change
- can be recycled as same material
- Metals recycled as metals
- (fine chemical corrections are part of normal production)
- But big energy input over reuse

Recycle

- Rubber tyres are being reduced to:
- rubber crumb
 - soft paving materials
 - acoustic isolation strips
- metal wires
 - reinforcing of concrete and screeds
- fabric
 - Reinforcing of concrete and screeds

Recycled: Downcycled

- Reduction in properties often occurs in plastics
- Can't be used in original form
- Relegated to a lesser or different task
- Polyethylene sheet as black bin bags
- Polyethylene as timber substitute
- Glass crushed and used as sand



BedZED Beddington Sutton Architect: Bill Dunster
Reclaim: BioRegional ReCLAIMED © Nicole Lazarus

Recycled: Downcycled

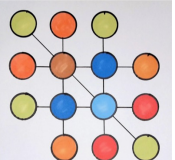
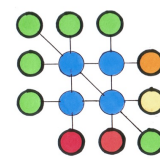
- Timber formwork and site hoarding down cycled as landscape mulch
- BRE research on leechates from concrete and release agents say this is safe
- Choice of paints on hoarding important
- Must be plant friendly

Glass sand for bedding



Glass sand bedding





Recycled: Upcycled

- Where a material can be converted into something better (greater value) in its second life:
- Scaffold board used in making a door
- Hardwood pallets dismantled and made into furniture



Scaffold boards = doors



Railway Sleepers = Furniture

Waste Hierarchy

new definition

Rethink, Re-educate, Resolve, Refocus,
Resource, Relate, Research, Refer,
Refresh, Rename, Regard, Revalue,
Remeasure, Reprogramme, Replan,
Reconsider, Refuse, Reject, Return,
Redesign, Regularise, Rehearse,
Rationalise, Remediate, Reduce,
Reserve, ReSpec, Register, Reuse,
Reclaim, Repair, Retain, Remind,
Recycle, Recover, Record, Report,
Reward, Review, Revise, Refine, Restart

Recover: Energy

- Recover energy from materials:
- Rubber tyres used as fuel in cement works
- Site fires waste energy and materials
- Set up wood burning stove for hot water in summer and heat in winter

Recover: Organics Nutrients

- Recover organic materials and nutrients through composting
- Subsoil converted to topsoil by adding compost
- Earth replenished with nutrients
- Not sent to landfill or burned

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Record

- Use BRE SMARTWaste to record waste generated on a daily basis
- Feed into national statistics via modem
- Receive daily reports on site waste performance
- Compare with national, regional company or own site targets
- Join the DEFRA funded 1000 site project

Record

- Throughout the project and contract Record notes in a wish-list
- Opportunities to avoid and Reduce waste and hazardous materials arising
- Record in Word templates which inform the next project via QA procedures

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Report

- Report on Records from SMARTWaste in Regular site meetings
- Determine causes and find Remedy
- Rectify contractual issues which may generate waste
- Report any suspicions or evidence of non-licensed waste handlers or fly-tipping to the EA

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Reward

- Set up league tables of different trade performance against KPI or other targets
- Record and compare on a regular basis
- Reward good performers
- Make it worth striving for
- Carrots and sticks work well together

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Review

- Review wish-lists for previous projects and contracts
- Try to avoid unnecessary waste and hazardous waste arising
- Learn from past experience
- Share and pass forward all knowledge gained
- Create and Review Templates where past project experience can be stored

Review

- Review procedures and ensure they are up to date
- EA guidance is being updated continuously
- www.netregs.gov.uk

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Revise

- Revise methods on next project
- SWMP checklist as a living document (like pre-tender CDM) first by Design Team, added to Preliminaries and then developed by Main Contractor

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Refine

- Review and refine each project to get better each time
- Refine templates and add from each project experience

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Restart

- Return to the start with new knowledge
- pReview and make it better next time
- Recycle knowledge gained

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Waste: Costs & Savings

**Fiscal Incentives: Taxes,
Costs & Savings**

Who is to blame and who pays?

- Employers/Clients pay for construction processes and building
- Employers/Clients don't yet embrace any responsibility
- Designers create waste in their proposals
- QS generate inaccurate quantities
- QS discourage waste & recycling requirements in contracts
- Contractors fail to recheck quantities
- Contractors buyers wont pay for waste segregation
- Contractors squander materials
- Waste handlers make excess profits off squandered materials
- Shadow economy receives free materials
- Clients pay for constructors waste: shadow economy materials

How can it change?

- Employer/Client signs up to SWMP
- Client takes on some responsibility for own actions
- Project team can educate the Employer/Client on the consequence of their actions
- SWMP team rationalise design to reduce waste
- Waste costs are understood and segregation savings are pursued
- Constructors become resource efficient
- Client pays less
- Constructors improve profit margins
- Waste Handlers profits down to acceptable level
- Environment benefits all round

File Updates 1

| Rev No. | Comments | Author | Date |
|------------|--|--------|------------|
| A00 | Created for CPD | BRM | 2002 |
| A01 | Many updates | BRM | 2002-2011 |
| A02 | Reset for GBE New Logos headers footers start and end slides | BRM | 31/10/2023 |
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| 31/10/2023 | © GRC CPD 2023 B9 CoreLogic | | 209 |



<https://GreenBuildingEncyclopaedia.uk>



<https://GreenBuildingCalculator.uk>



<https://GreenBuidlingCalculator.uk>

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