Slide 1

Slide 4

Slide 5

Slide 6

Slide 7

Slide 8

Slide 9

Slide 10

Slide 11

Slide 12

12

12

Slide 13

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   © NGS   13

13

Slide 14

BedZED Beddington Sutton Architect: Bill Dunster
Reclaim: BioRegional ReCLAIMED © Nicole Lazarus   14

14

Slide 15

Recycle: Glass sand for bedding

15

15

Slide 16

Effort

Waste Hierarchy
The reality

Reduce
Less

Reuse & Recycle

Recover

Reject
More

16

16

Slide 17

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

17

17

Slide 18

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, Rational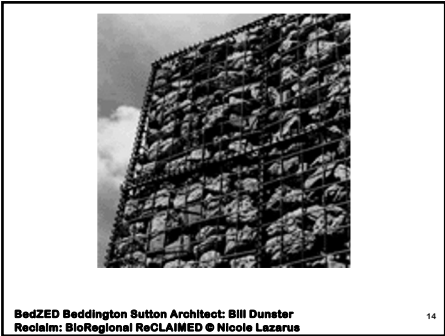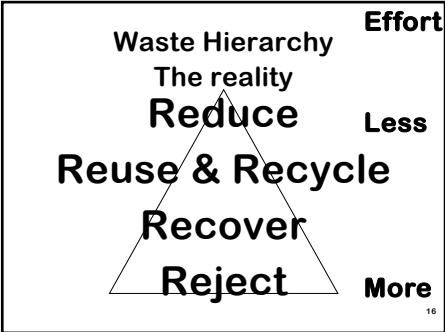ise, Remediate, Reduce, Reserve, ReSpec, Register, Reuse, Reclaim, Repair, Retain, Remind, Recycle, Recover, Record, Report, Reward, Review, Revise, Refine, Restart

18

18

Slide 19

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

19

19

Slide 20

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'

20

20

**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   21

21

**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   22

22

**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   23

23

**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   24

24

25

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

26

**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   27

27

**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
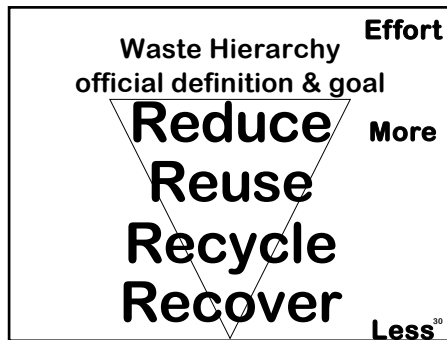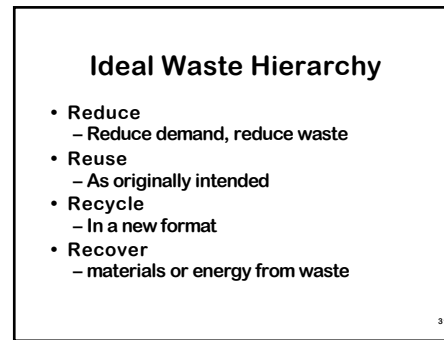- Restart: return to start with new knowledge and make it better next time   28

28

Waste Hierarchy

Principles of Waste Management/Minimisation
Expanded Waste Hierarchy

29
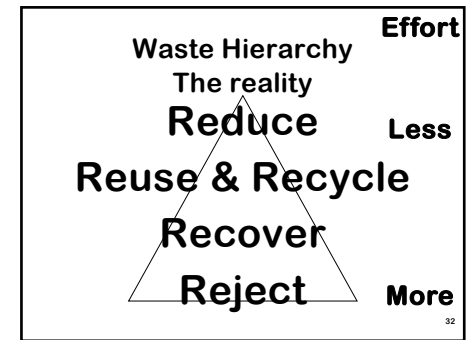
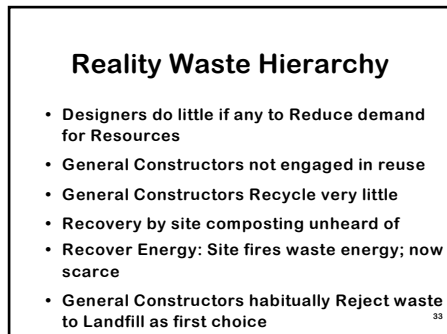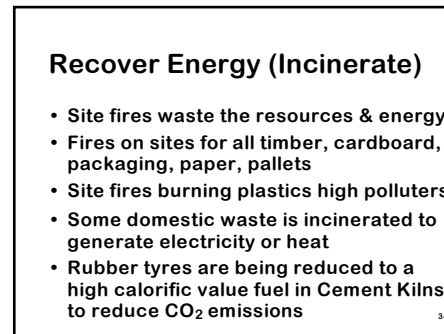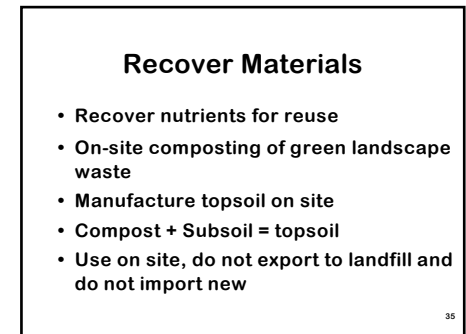### Waste Hierarchy official definition & goal

Effort

Reduce
Reuse
Recycle
Recover

More

Less 30

30

Ideal Waste Hierarchy

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

31

31

Waste Hierarchy The reality

Effort

Reduce

Less

Reuse & Recycle
Recover
Reject

More 32

32

Reality Waste Hierarchy

- Designers do little if any to Reduce demand for Resources
- General Constructors not engaged in reuse
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- Recover Energy: Site fires waste energy; now scarce
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33

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 CO_2 emissions 34

34

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

35

35

Reject (Landfill)

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

36

36

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 37

37

Long Waste Hierarchy Short Definition

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- **Refocus** to address resource efficiency throughout design and construction and not just focus on waste minimisation after it 38
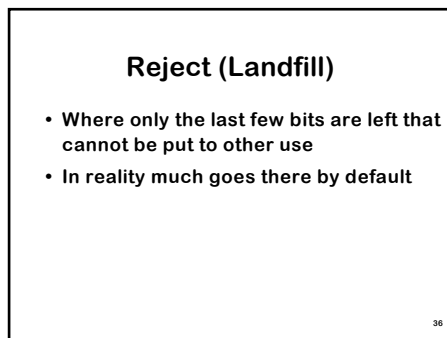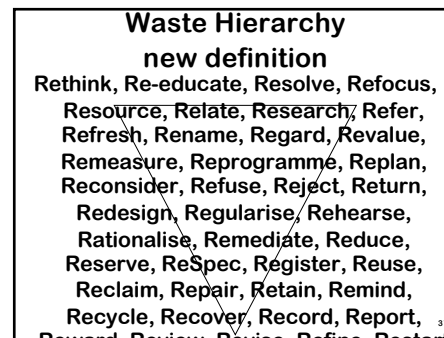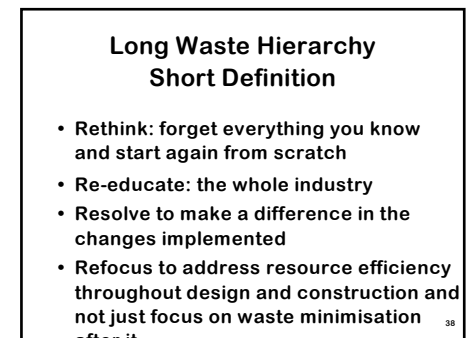
38

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Short Definition

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39

39

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- Re-programme to make time to do it
- Re-plan the site to facilitate resource efficiency

40

40

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41

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Short Definition

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- 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

45

45

Waste Hierarchy
new definition

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46

46

Waste Hierarchy
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47

47

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

48

48

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

49

49

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

50

50

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

51

51

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

52

52

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

53

53

Relearn some waste statistics

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

54

54

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

55

55

Resolve

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

56

56

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

57

57

Refocus

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

58

58

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

59

59

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

60

60

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

61

61

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

62

62

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

63

63

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

64

64

Research

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

65

65

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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

66

66

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.

67

67

Waste Hierarchy
new definition
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68

68

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

69

69

Waste Hierarchy
new definition
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70

70

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

71

71

GBE   GBC   GRC
https://GreenBuildingEncyclopaedia.uk   https://GreenBuildingCalculator.uk   https://GreenBuildingCalculator.uk

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 arrisings chipping and handling requires permission

72

72

GBE   GBC   GRC
https://GreenBuildingEncyclopaedia.uk   https://GreenBuildingCalculator.uk   https://GreenBuildingCalculator.uk

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

73

73

Waste Hierarchy
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74

74

Regard

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

75

75

Waste Hierarchy
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76

76

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

77

77

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

79

79

Revalue

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

80

80

Waste Hierarchy
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81

81

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

82

82

Re-measure

- Reclamaition 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

83

83

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84

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

85

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

86

Waste Hierarchy
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87

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

88

89

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90

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

91

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92

Slide 93 — 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

93

Slide 94 — 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

94

Slide 95

95

Slide 96 — 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

96

Slide 97 — 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

97

Slide 98 — 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

Slide 99 — 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

99

Slide 100 — 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

100

Slide 101 — 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

101

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
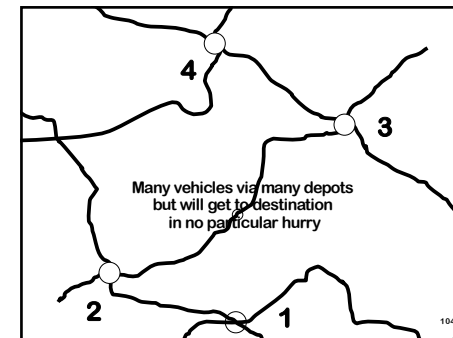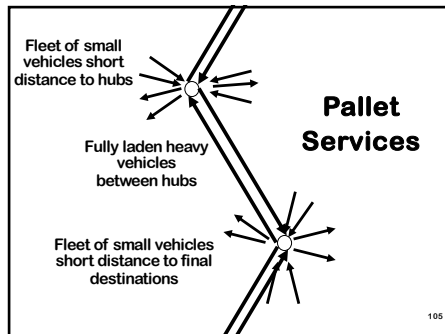
102

Couriers: offer take back schem

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
103

103

4

3

Many vehicles via many depots but will get to destination in no particular hurry

2   1
104

104

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

105

105

Waste Hierarchy
new definition

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106

106

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

107

107

Modular designs waste less

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

Robin Hiller Diggers Self-build Brighton

CAT Centre for Alternative Technology

108

108

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

109

109

Waste Hierarchy
new definition

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110

110

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

111

111

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

112

112

Waste Hierarchy
new definition
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Reward, Review, Revise, Refine, Restart

113

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

114

114

Rehearse

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

115

115

Rehearse

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

116

116

Waste Hierarchy
new definition
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Reward, Review, Revise, Refine, Restart

117

Rationalise

- Use Construction Consolidation Centre
- Rationalise big deliveries to CCCentre
- 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 118

118
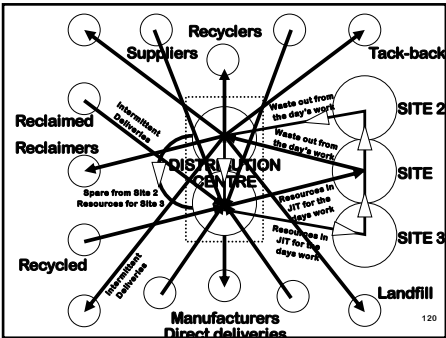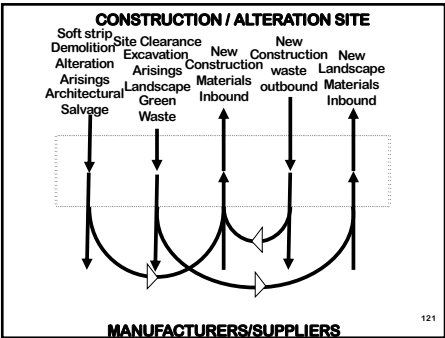
Rationalise Delivery Schedule

- 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

119

119

120

CONSTRUCTION / ALTERATION SITE

121

Waste Hierarchy
new definition
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122

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

123

Waste Hierarchy
new definition
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124

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

125

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

126

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

127

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

128

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

129

129

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

130

130

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

131

131

Waste Hierarchy
new definition
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132

132

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

133

133

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

134

134

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

135

135

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

136

136

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

137

137

Slide 138 — ReSpecify with NGS

GBE GBC GRC
https://GreenBuildingEncyclopaedia.uk Green Building Calculator Green Retrofit Calculator

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

138

138

Slide 139 — Waste Hierarchy new definition

Waste Hierarchy
new definition
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139

139

Slide 140 — Register

GBE GBC GRC
https://GreenBuildingEncyclopaedia.uk Green Building Calculator Green Retrofit Calculator

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

140

140

Slide 141 — Registration

GBE GBC GRC
https://GreenBuildingEncyclopaedia.uk Green Building Calculator Green Retrofit Calculator

Registration

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

141

141

Slide 142 — Waste Hierarchy new definition

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

142

142

Slide 143 — Reuse

GBE GBC GRC
https://GreenBuildingEncyclopaedia.uk Green Building Calculator Green Retrofit Calculator

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

143

143

Slide 144 — Why use hoardings once?

Why use hoardings once?

144

144

Slide 145 — Timber is a renewable material

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

145

145

Slide 146 — Reusable steel hoardings

Reusable steel hoardings

146

146

Slide 147

GBE **GBC** **GRC**

Steel is less sustainable than timber

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

147

147

Slide 148

Reusable steel fencing

148

148

Slide 149

GBE **GBC** **GRC**

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)

149

149

Slide 150

Reclaimed repaired reused

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

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

150

150

Slide 151

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

151

151

Slide 152

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

152

152

Slide 153

Waste Hierarchy new definition

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153

153

Slide 154

GBE **GBC** **GRC**

Reclaim for reuse

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

154

154

Slide 155

Reused wood better than new

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

155

155

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

156

157

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158

Repair and Reuse

GBE GBC GRC
https://GreenBuildingEncyclopaedia.uk https://GreenBuildingCalculator.uk Green Retrofit Calculator

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

159

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   © NGS

160

GBE GBC GRC
https://GreenBuildingEncyclopaedia.uk https://GreenBuildingCalculator.uk Green Retrofit Calculator

Repairs with Traditional Materials

Conservation Quality Refurbishment

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

161

Visible repairs required by CO

162

Waste Hierarchy
new definition

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163

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https://GreenBuildingEncyclopaedia.uk https://GreenBuildingCalculator.uk https://GreenBuildingCalculator.uk

Retain

• Retain repair and reuse buildings

164

Slide 165

Retain & Repair Ordinary buildings with townscape importance

165

Slide 166

166

Slide 167

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

167

Slide 168

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

168

Slide 169

Visible repairs over long life

Retention of excess to requirements is essential

169

Slide 170

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

170

Slide 171

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

171

Slide 172

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

172

Slide 173

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

173

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

174

174

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

175

175

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

176

176

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

177

177

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

178

178

Glass sand for bedding

179

179

Glass sand bedding

180

180

Recycled: Upcycled

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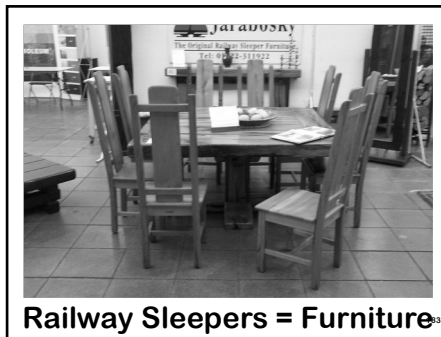- Hardwood pallets dismantled and made into furniture

181

181

Scaffold boards = doors

182

182

Railway Sleepers = Furniture

183

Waste Hierarchy
new definition
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184

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

185

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

186

Waste Hierarchy
new definition
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187

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

188

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

189

Waste Hierarchy
new definition
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190

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

191

Slide 192

Waste Hierarchy
new definition
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192

Slide 193

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

193

Slide 194

Waste Hierarchy
new definition
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194

Slide 195

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

195

Slide 196

Review

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

196

Slide 197

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

197

Slide 198

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

198

Slide 199

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

199

Slide 200

Refine

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

200

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

201

Restart

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

202

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

203

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

204

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

205

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

206

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

209

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- Brian Murphy ONC HNC Construction, BSc Dip Architecture (Hons+Dist)
  - Technician and Architect by Training
  - Specification Writer by Choice
  - Environmentalist by Actions
  - Writer and Educator as a Calling
  - **Number Cruncher by Necessity**
- Greening up my act since 1999
- Founded National Green Specification 2001
- Launched www.greenspec.co.uk 2003
- Created: GBE at https://greenbuildingencyclopaedia.uk 2012 – 2021
- **Created: GBL Learning: https://GBELearning.com 2020 - 2021**
- Created: GBC at https://GreenBuildingCalculator.uk 2011 - 2021
- E BrianSpecMan@cloud.com
- Twitter: https://twitter.com/brianspecman
- **Twitter: https://twitter.com/beGreenBuild**
- Twitter: https://twitter.com/GBEGreenThink
- LinkedIn: BrianSpecMan
- Facebook: BrianSpecMan http://www.facebook.com/brianspecman
- GoogleMyBusiness: National Green Specification
- Pinterest: Brian Murphy - GBE Green Building Encyclopaedia
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210