



WORLD MATERIALS FORUM



Recycle and Reuse



Innovative Technologies



Smart Technologies



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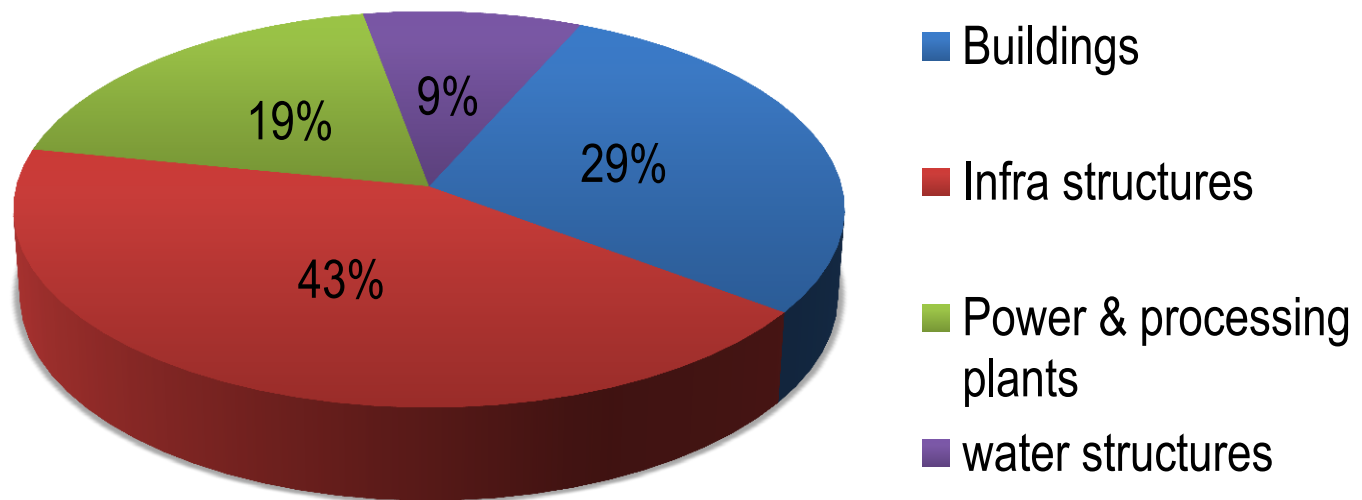
Greater emphasis in construction to use recycled aggregates

to reduce natural materials demand

– a case study on aggregates



Concrete consumption in development process of various structures



Concrete – A wonderful construction material

Cement

- World 2.5 billion tons
- >50% production by China and India

Concrete 1cu.m

- 0.5 t C+Mineral admixture
- Water 0.25t
- Aggregates 1.6t

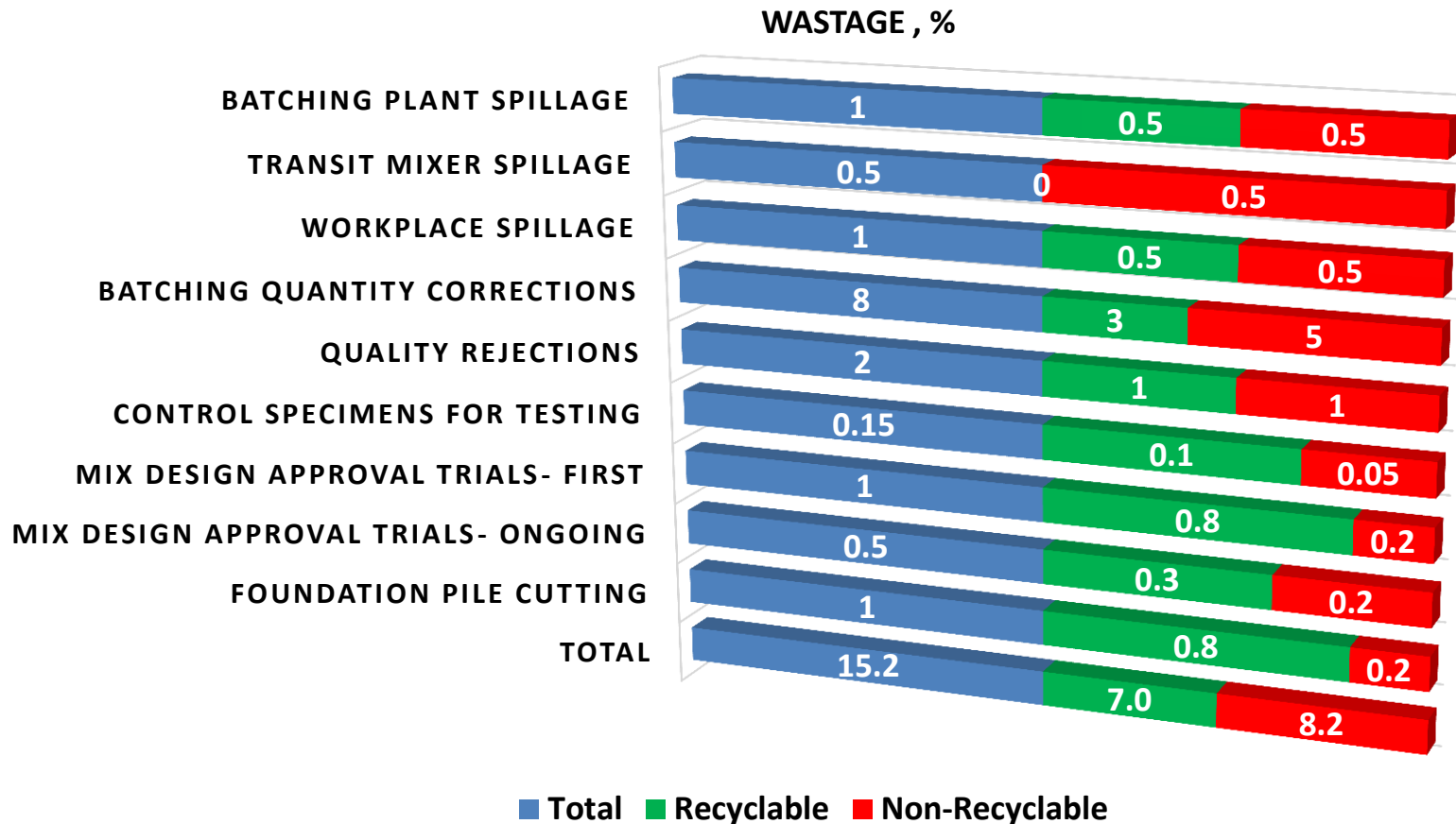
CD waste

- 510 million t Europe
- 325 mt USA
- 77 mt Japan
- Land filling & No Organised recycle in many countries.

Fresh aggregates constitutes 68% to produce 1cu. m of concrete

10 M cu.m of concrete for mega, medium and small scale development project works in a year
Cement itious Mixture– 5 million t, **Water** – 2.5 billion liters, **Aggregates** – 16 million t

How Concrete wastage takes place in actual construction?



Value of recycling from actual Concrete produced



Concrete Consumption
10 M cum

676 M\$

Concrete Waste
1.5 M cum (15%)

101 M\$

Non Recyclable
0.8M cum (8%)

54 M\$

Recyclable
0.7Mcum (7%)

47 M\$

Concrete Aggregates
(1 Mt)

35 M\$

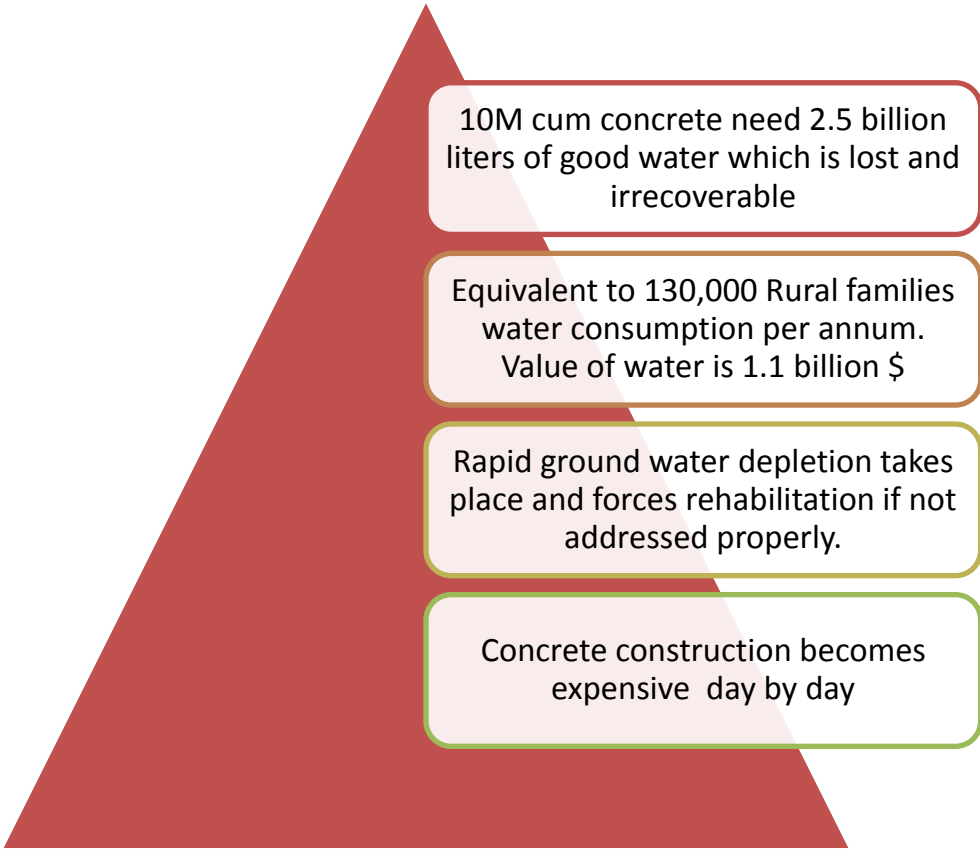


M – Million; cum – cubic meter

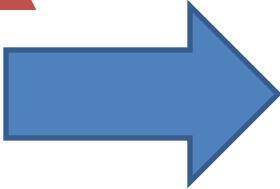


Hence organised collection construction & demolition waste a few countries had set the target of total natural aggregates replacement by 80%. By this system implementation all over the world dependency on natural aggregates, mining, crushing and transportation etc., will change with greater focus on green sustainable measures .

Dependency on potable water in construction to be reduced



Need to be addressed systematically



concrete without cement - Geopolymer concrete (future technology ?)

One of the breakthrough technology - GPC

Currently in non-structural grade concrete it has direct application

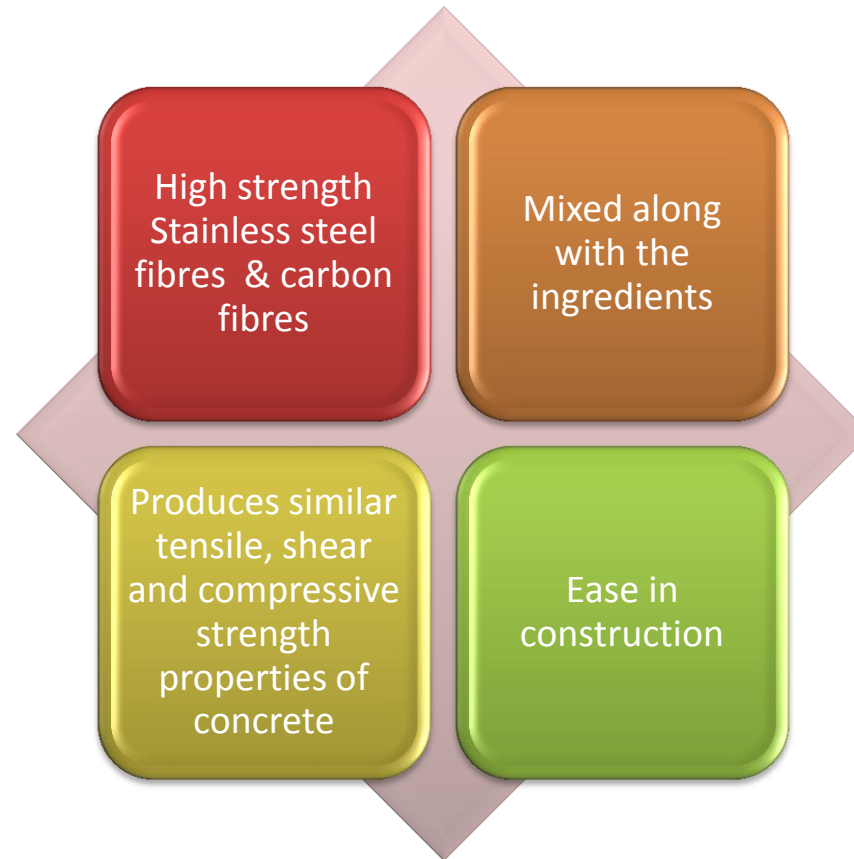
As there are no standards for structural grade concrete it requires some more research and to form guidelines

Cement is totally replaced

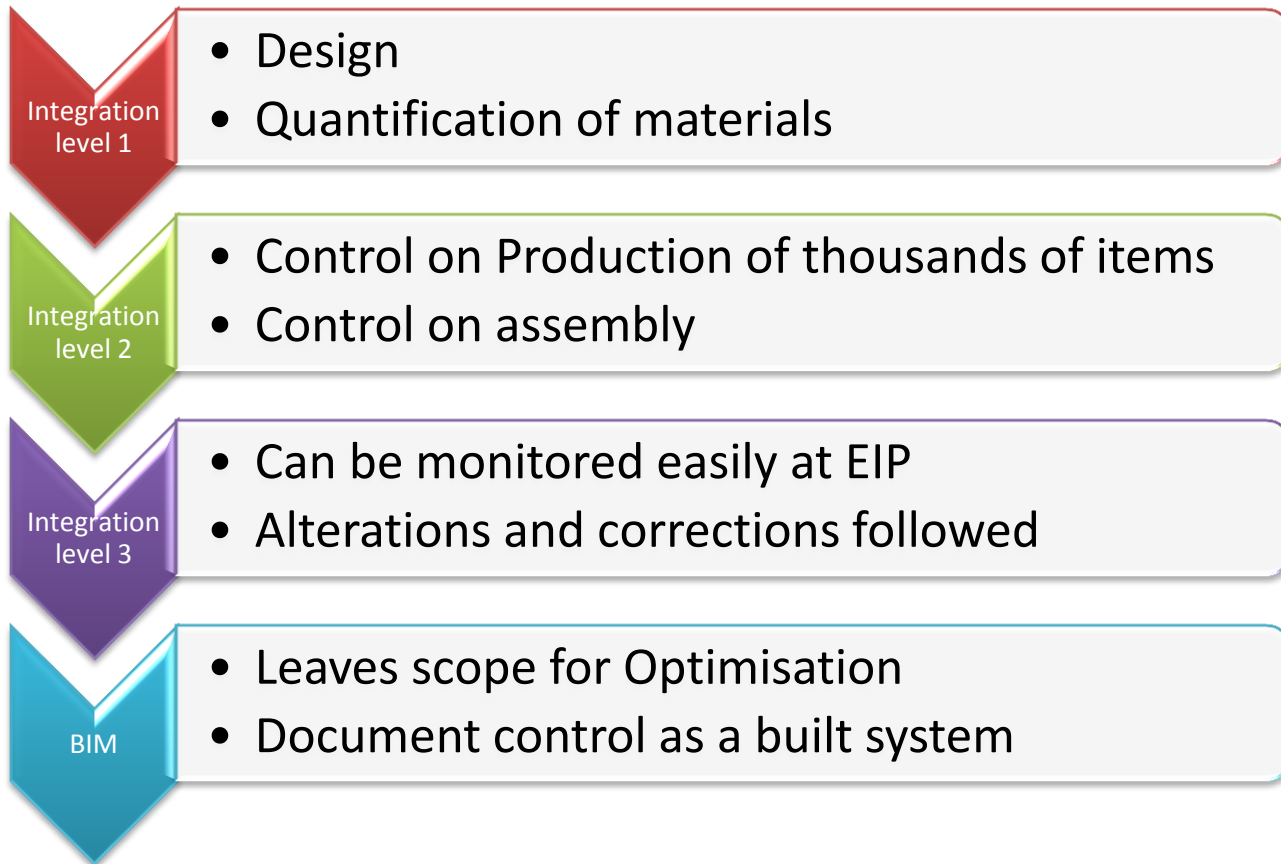
Flyash, slag, sand, aggregates and chemical activators are the constituents

Cost is economical. M40 grade concrete is at the same cost

Reinforced concrete without cement and rebar steel (future technology similar to UHFRC ?)



Application of BIM in construction



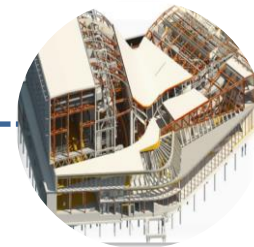
Departure to conventional technologies and bring in Digital technologies in construction



Ledar ,
Robotics
technologies,
.....



Mobile
apps



Lean
management

Conclusions

Conserve natural products by promoting recycling, reuse and rebuild in construction.

Set bench marks on recycling and reuse and should be gradually improved to 90% over 5-10 years by ISO standards.

Leave natural resources for next generation

Research and Technology should be continuous to discover innovative materials and methods of construction so that civilisation sustains.

Any new technology or introduction of new materials of construction requires training, standardisation, regulation and continuous change in curriculum.



Thank you