DINCEL
STRUCTURAL WALLING


# DINCEL STRUCTURAL WALLING

## SUSTAINABLE CONCRETE

Concrete is the most abundant construction material. The world's cement production in 1997 was stated as 1.57 x $10^9$ tonnes/year (Humphreys, Mahasenan 2002). After this quantity of cement is mixed with water, gravel and admixtures it produces the equivalent of 1.05 x 1010/ tonnes/year of concrete. An average of 15% cement is used per cubic metre of concrete.

The human population is increasing rapidly. The world's population was 200 Million in the Year Zero AD, 1 Billion in the Year 1800 AD, 2.4 Billion in the Year 1950 AD, currently 6.8 Billion, and an estimation of 12 Billion in the Year 2050 AD. This exponential growth in the human population has an impact on concrete production.

1. The major global impact of cement production is its contribution to greenhouse emissions. The world's average estimate of CO2 generation varies from 0.81 kg of CO2 per kg of cement (Gale, Freund 2000) to 0.89 per kg of CO2 per kg of cement (Humphreys, Mahasenan 2002).

   Portland cement is responsible for about 10% of the world's total anthropogenic CO2 emissions (Pierce F 1977-New Scientist, No: 2097, p14 – The Concrete Jungle Overheats).

2. Due to the exponentially increasing use, the price of cement in coming years will sharply rise as a result of increased energy and carbon costs. This will affect the affordability of man-made structures.

3. Locally available raw materials for concrete's sustainability are essential. There are many countries that do not have appropriate sand, aggregates and cement for proper concrete making which will not lead to concrete cancer. The real problem for our future is the availability of raw materials for concrete making.

4. Nowadays there is no new alternative that effectively substitutes clinker-based cement.

## WHAT IS THE SOLUTION?

The demand for cement use increases with the world's population. It is impossible to control the exponential world population increase. There is no alternative solution for concrete considering raw materials, world's established concrete production and costs.

The solution may consist of the following:

**(i) Increase the Use of Fly Ash in Concrete**

**(Download – Dincel-Fly Ash Cement Concrete)**

**(ii) Increase the Service Life of Concrete**

Solving problems start with identifying the problems **(Download – Dincel Solution for Concrete Problems and Cement Minimisation)**.

Conventional concrete is porous and cracking is unavoidable. Cement is added to decrease the porosity of concrete, but additional cement exacerbates the shrinkage cracking of the concrete. Increased concrete covers to the steel reinforcement (i.e. more concrete), more cement use, joints, better control of concrete curing and concrete placement are the current durability control measures of reinforced concrete science.

The solution by Dincel Construction System offers:

- Dincel-wall, as tested by the CSIRO-Australia is waterproof, thus the porosity of common concrete, i.e. additional cement use, is not warranted for durability purposes and the concrete cover to the reinforcements can be significantly reduced. The permanent and waterproof protection by DCS also eliminates steel corrosion. This qualifies Dincel Construction System as the solution for the DURABILITY of its concrete infill.
- Permanent Dincel-polymer encapsulation of concrete resulting in the best curing option for concrete.
- Permanent Dincel-form incorporating in-built crack inducers, hence eliminating the need for joints.
- Impervious Dincel-polymer does not have capillary action between the forms and the wet concrete mix. This eliminates the major problem of concrete honeycombing associated with formwork materials and concrete placement.
- Dincel eliminates the use of crack control reinforcement because of its in-built crack control joints. This way, at least the wall's steel reinforcement is eliminated to allow Dincel-wall to be crushed; polymer, steel, aggregate and mortar are easily separated and recycled for concrete re-making at the end of Dincel-wall's life cycle which is a minimum of 100 years.
- There are many countries that do not have appropriate raw materials for concrete making. The waterproof Dincel-polymer's protection allows corals, shale, volcanic rocks and sand from the sea. No air means no concrete degradation or steel corrosion within the protection of Dincel.
- The superior curing and durability solution offered by Dincel Construction System allows the use of fly ash in its raw form without treatment as a replacement for cement. **(Download – Dincel-Fly Ash Cement Concrete)**

  **This way, the service life of commonly available concrete is significantly increased, the available material can be recycled and currently inappropriate resources can be used in concrete production.**

  For more information the reader can refer to:
  **(Download – Waterproof Walls)**
  **(Download – Common Engineering Questions)**

## REFERENCES

(1) Humphreys, K; Mahasenan, M; Climate Change (Toward Sustainable Development, March 2002)



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