

Better to be sustainable

Stainless steel reinforcement

Why use stainless steel reinforcing bar?

Carbon steel reinforcement will corrode when chloride ion penetrates the concrete and contacts the steel. The corrosion products are expansionary and cause the concrete to crack and spall - repair then becomes necessary.

Carbon steel can only tolerate chloride levels of 0 – 0.4%.

- Stainless steel can tolerate chloride levels up to 7%.
- Stainless steel improves the durability of the structure, and reduces ongoing maintenance and repair costs.



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Why does stainless steel reinforcing bar not fail?

Stainless steel is protected by a chromium oxide layer on the surface which is highly resistant to levels of chloride ion - levels which are considerably higher than those encountered in reinforced concrete structures.



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Nickel Institute



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When to use stainless steel ?

- When structures are exposed to high chloride environments and/or corrosive industrial environments
- In roads and bridges where de-icing salts are applied
- When non-magnetic reinforcement is necessary or desirable



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Where to use stainless steel ?

- For sea walls and coastal defences
- In highway bridges and roadways
- In coastal structures
- In historic buildings where longevity is essential
- In underpasses



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How to use stainless steel reinforcement

A full range of stainless steel reinforcement is manufactured to British Standard BS6744: 2001. The other principal Standard is the USA document ASTM A955/A955M-03b.

Other National Standards and Official Admissions are available in Denmark, Germany, Italy, France and Finland, but are less comprehensive.

Use of stainless steel reinforcement can permit the following:

- Elimination of concrete sealants such as Silane.
- An increase in crack width to 0.3 mm.
- A reduction in depth of concrete cover to 30 mm.



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How to use stainless steel cost-effectively:

- By placing it in the elements of the structure at high risk to corrosion or where repair is difficult or expensive. Carbon steel can be used for the nil corrosion risk elements.
- A separating barrier between stainless steel and carbon steel reinforcement is not necessary in concrete. Galvanic reaction is not a design consideration as proven by test.



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The economics...

It has been shown that construction costs follow the Law of Fives

- Improved design and materials – 1 US\$
- Preventative maintenance – 5US\$
- Ongoing maintenance – 25US\$
- Rehabilitation – 125US\$



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