

A NOTE ON THE PRESERVATIVE TREATMENT FOR MILD STEEL RODS STORED IN THE OPEN AND MEANT FOR SUBSEQUENT USE IN REINFORCEMENT STRUCTURES

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ABSTRACT

Of the various preservative treatment compositions tried on experimental mild steel rods held in the open and required for use in re-inforcement, a mixture of 2 parts of cement+1 part of paint (Paint P.F.U. Priming G.S. Brushing Red Oxide of Iron Zinc Chromate, IHA-0541) has been found satisfactory, as revealed from exposure trials carried out for 4 months, during which the treatment has withstood the severe rains and humid conditions.

Introduction

Considerable tonnage of mild steel rods for structural purposes is held in storage in Service installations (*e.g.* in Engineer Stores Depots, Engineer Parks, Divisional and Project Yards of the Garrison Engineers, and for local construction, maintenance, A-in-U (Articles in use) and repairs in Ord. Depots, Naval Dockyards and Naval Stores Depots, and Equipment Depots in Air Force). Due to shortage of covered accommodation in depots/units, these rods are normally stored in the open on dunnage. During their storage in the open, they become rusty, unless they are preserved by applying a suitable protective coating on them. At the same time the coating given should not be incompatible with subsequent user requirements. For instance, steel rods which are not meant for re-inforcement, but are required to be fitted as cross/vertical bars for windows/gates for security purposes (as adjunct to the expanded metal for further protection) can be straightaway preserved during their storage by applying a coating of suitable paint, since these rods will, in any case, be eventually painted during their use. Hence the paint which will be applied during their use can be applied during their storage as well, for purposes of preservation. On the other hand, the case is not so simple with the rods meant for re-inforcement, because, they cannot be used in a painted condition and directly incorporated in works as it will interfere with re-inforcement and will not ensure sufficient bonding. In any event, the protective coating to be accorded on steel rods meant for re-inforcement, should be such as can be removed before the rods are incorporated in works. Under the circumstances, it has been customary to give a "Cement wash" to such rods, as a temporary preservative coating. But unfortunately, the cement wash does not last long and requires replenishment/retreatment soon after every monsoon as the rods even after the cement wash continue to be held in the open and exposed to monsoon

and humid weather, resulting in the loss of the cement coating. Further such non-durable coating leads only to wastage of labour, materials and time.

It is, therefore, desired to prolong the life of the "Cement wash" by admixing suitable materials with it, which will—

- (a) not flake off, and help in adhesion of the coating on the rods,
- (b) be easily scrapable before incorporating the rods in works,
- (c) prevent rust forming on the rods, and
- (d) be comparatively more durable than cement wash alone.

Experimental

The trial commenced on 30th May 1953 (F.N.) in the open store yard of SDO MES, Ranchi, 12 pieces of mild steel rods each about 12'—15' long and $\frac{1}{2}$ " diameter were given the following treatments :—

Rod No.	Composition of Preservative Mixture	
	Parts of cement	Parts of paint/linseed oil
1	Untreated	
2	Cement wash (with glue)	(Not mixed with paint/linseed oil)
3	Cement wash (without glue)	Do.
4	2 cement	1 paint PFU Red Oxide of Iron GS (now superseded by Paint PFU Priming GS Brushing Red Oxide of Iron Zinc Chromate).
5	1½ cement	Do.
6	1 cement	Do.
7	2 cement	1 Double boiled linseed oil.
8	1½ cement	Do.
9	1 cement	Do.
10	1 cement	1 GS paint
11	2 cement	3 GS paint
12	1 cement	3 GS paint

The preservative mixture was thoroughly agitated before application in order to maintain homogeneity of the composition. The treated/test pieces were stacked outside on brick dunnage as in normal storage.

Observations

Monthly observations were recorded in respect of :—

- (a) degree of flaking,
- (b) scrapability, and
- (c) extent of rusting of treated surfaces.

The observations were recorded for four months, and summarised in Appendix 'A'.

The following were revealed :

- (a) The experimental treatment accorded to rod No. 4 withstood the severe rains/monsoons and humid/moist conditions.
- (b) Composition wherein cement exceeds 2 parts was found either—
 - (i) not of a paintable consistency being relatively thicker, or
 - (ii) even when applied it peels off (due to increase in cement and decrease in the bonding/binding material viz. paint).
- (c) It would appear that the mixture of 2 parts of cement : 1 part of Paint pfu Red Oxide of Iron GS (now superseded by the paint mentioned against rod No. 4) is satisfactory for preservative treatment of the store in question, in preference to "cement wash" alone.

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Date 30-6-53 (*i.e.* 1 month after commencement)

	1	2	3	4	5	6	7	8	9	10	11	12
Flaking	..	Appreciable	Very appreciable	No evidence	Negligible	Very slight	Very slight	Slight	Slight	Slight	Slight	Very slight
Scrapability	..	Do.	Do.	Good	Very fair	Fair	Very fair	Very fair	Fair	Fair	Very fair	Fair
Rusting	Very appreciable	Do.	Do.	No evidence	Negligible	Very slight	Very slight	Slight	Slight	Slight	Very slight	Very slight

Date 30-7-53 (*i.e.* 2 months after commencement)

Flaking	..	More appreciable	More appreciable	No evidence	Negligible	Slight	Very slight	Slight	Slight	Slight	Slight	Slight
Scrapability	..	Appreciable	Very appreciable	Good	Fair	Fair	Fair	Fair	Fair	Fair	Fair	Fair
Rusting	More Rusty	More appreciable	More appreciable	No evidence	Very slight	Very slight	Slight	Slight	Slight	Slight	Very slight	Very slight

Date 30-8-53 (i.e. 3 months after commencement)

	1	2	3	4	5	6	7	8	8	10	11	12
Flaking	..	More appreciable	More appreciable	No. evidence	Negligible	Slight	Slight	Slight	Slight	Slight	Slight	Slight
Scrapability	..	Appreciable	Very Appreciable	Good	Fair	Fair	Fair	Fair	Fair	Fair	Fair	Fair
Rusting	More rusty (several places)	Partly rusty	Partly rusty	Negligible	Very slight	Very slight	Slight	Slight	Slight	Slight	Very slight	Very slight

Date 30-9-53 (i.e. 4 months after commencement)

Flaking	..	Completely	More appreciable	Negligible	Negligible	Slight	Slight	Slight	Slight	Slight	Slight	Slight
Scrapability	..	(Film Completely lost)	Very appreciable	Good	Fair	Fair	Fair	Fair	Fair	Fair	Fair	Fair
Rusting	Completely rusty	Rusty (several places)	Rusty (several places)	Negligible	Very slight	Very slight	Slight	Slight	Slight	Slight	Very slight	Very slight