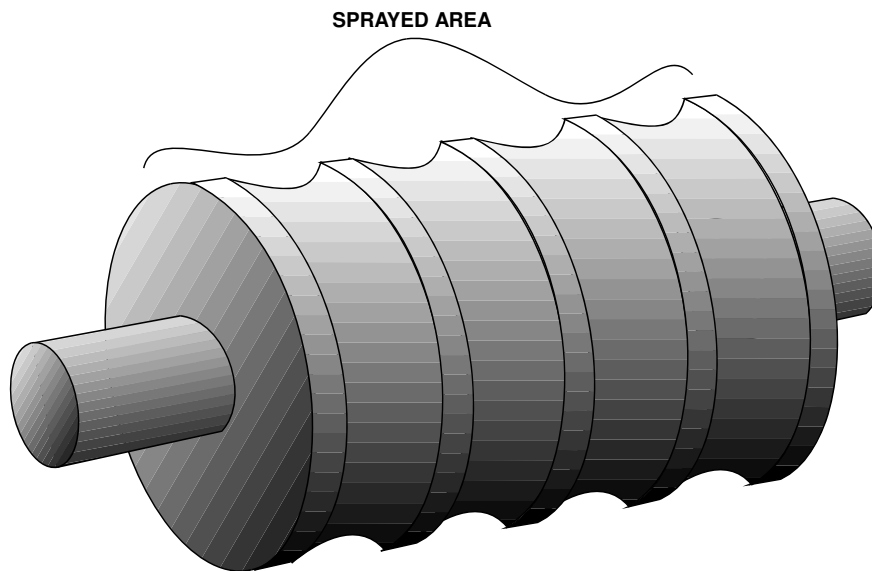


# ARCSPRAYING OF MILL ROLLS

## Application Data Sheet HE-FC-002

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### INTRODUCTION

In the past, tremendous problems have been associated with billet 'biting' on newly machined mill rolls. The rolls have a very smooth finish after being machined and therefore offer less surface friction on the billet to pull it through the mill stand. This problem occurs mainly where a large bite angle occurs in the roll pass design, that is where the size of the billet entering the stand is relatively large compared to the size of the roll pass profile of that stand. This occurs mainly in the roughing stands at both the rod and bar mill. It was found out that certain metal sprayed coatings applied to the rolls can alleviate this problem by providing the necessary surface roughness on the rolls. Properties of such a coating would have to fulfil the following criteria:

- (a) Provide the necessary surface roughness.
- (b) Provide the necessary hardness to withstand the rolling forces involved.
- (c) Provide sufficiently high bond strength to the parent metal in order to prevent any failure in shear of the coating.
- (d) The coating must also offer enough life until the necessary roughness is worn into the parent metal of the roll.
- (e) The coating should eliminate all biting problems, in order to eliminate plant stoppages and scrap tonnages due to bite problems.

## EQUIPMENT

Metallisation ArcSpray 528E, 340 or 140E

## MATERIALS

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Metallisation 75E material exotherms during spraying, which produces very high bond strength coatings.

## ECONOMIC EVALUATION

The time saving is based on stoppages booked at a bar and rod mill against the biting problem. These times were averaged over two months, prior to any coatings being applied.

Material savings are based on the assumption that on average half a billet gets scrapped on start up in order to overcome this problem.

| Monthly Savings      | Hours/Tons |
|----------------------|------------|
| Bar Mill<br>Downtime | 1.07       |
| Floor Losses         | 4          |
|                      |            |
| Rod Mill<br>Downtime | 2.175      |
| Floor Losses         | 4          |

The reasons for using the Arcspraying equipment instead of flamespraying are as follows:-

- (a) Although the capital costs are higher, the consumable costs are considerably cheaper than those used for flame spraying.
- (b) The energy costs of Arcspraying are considerably cheaper than the oxy-acetylene supply needs for the flame spraying.
- (c) Arcspraying offers a safer and easier operation, with better control over spraying variables.
- (d) Arcspraying offers considerably higher bond strength than flame spraying

## METHOD

### Preliminary Inspection

Rolls should be checked for previous deposits and any other major faults.

## Cleaning

Degrease using any approved industrial solvent may be used to completely remove grease or oil from the surface

## Blasting

Where grit blasting facilities are available, it is recommended that they be used. The standard of surface cleanliness required is as Swedish Standard SA3. Bearing surfaces not being treated should be masked before blasting.

## Pre-Machining

Where grit blasting facilities are not available, pre-machining by rough threading or grinding should be carried out before spraying

## APPLICATION OF SPRAYED COATING

Spraying should begin as soon as possible after preparation and before any visible sign of deterioration occurs. The Roll is mounted in between centres. The surface speed should not be less than 60 feet per minute. (18 metres/minute).

- (A) The Arcspray Equipment should be set up in accordance with the Metallisation Manual for the spraying of 75E wire.
- (B) The Area to be sprayed should be cleaned with a vacuum cleaner or clean air blast to remove any loose particles of grit.
- (C) The Arcspray Pistol should be set so that the spray stream is at 90° to the surface being coated and traversed at an even speed giving a uniform coating.
- (D) Apply 75E Coating to the required thickness.
- (E) Spraying Parameters
  - (i) Range 100mm (4")
  - (ii) Nozzle Air Pressure 3.37 Bar (55 psi)
  - (iii) Voltage before spraying 38 Volts
  - (iv) Voltage during spraying 34 Volts
  - (v) Amperage 200 Amps

**Note:** Parameters may differ in accordance with type and length of power cables being used.

## General

There should be the minimum of interruption from commencement of preparation to completion of spraying. At all times, the prepared surface should be protected from dust, dirt, moisture etc.

## **Finish Grind**

No finishing is required as the coating is used as sprayed.

✦ REFERENCE TECHNICAL BULLETIN N°S :-

2.3.17 Metallisation Bonding Material 75E

HE-FC-001 Flamespraying of Mill Rolls