SURFACE CONDITIONS

Fitz's Atlas of coating defects

INDEX OF SURFACE CONDITIONS

SURFACE PREPARATION

CORROSION TRAP

EDGES-Flame cut

EDGES-Sharp

MILL SCALE

MILLSCALE- **“A”** quality steel

MILLSCALE- **“B”** quality steel

MILLSCALE- **“C”** quality steel

OIL CONTAMINATION

SKIP WELD

SLAG

SURFACE PREPARATION

This section includes pictorial examples of some typical conditions/from bare steel through to failed coating system, likely to be encountered before any surface preparation is carried out. Also illustrated are some typical problem areas which need to be appropriately treated prior to or during full surface preparation.
Various photographs are included which show mill scale on unprepared steel at various stages of degradation.
Whenever grinding is used for removal of defects, professional advice should be sought to ensure that the integrity of the structure or vessel is not compromised. Strict limits are usually applied to the thickness of metal which can be removed by grinding e.g. with high pressure pipework.

Burrs

Bolt holes and other cut areas should be thoroughly checked for burrs and rough edges,which should be removed by grinding or other suitable means.

Contamination on surface

Oil, grease and other foreign contamination must be removed by solvent cleaning or the use of an alternative suitable biodegradable cleaner prior to full surface preparation.

Edges

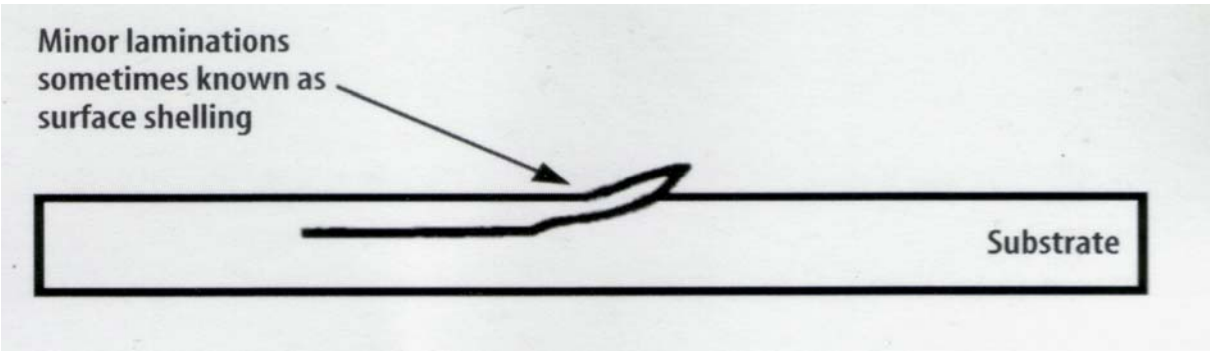
All edges should be radiused to provide a smooth round surface to which the paint can adhere to provide good protection.

Feathering

Where repairs are carried out to an already painted surface, the edge of the old paint should be feathered to a sound, well adhered thin edge using an appropriate means of abrasion, prior to overcoating.

Laminations, Surface Shelling or Hackles

The steel surface should be checked for laminations both before and after surface preparation. Any laminations found must be removed by grinding before application of any coating system.The use of an Ultrasonic thickness gauge may be necessary to determine the extent ofdelamination.



Mill Scale
All mill scale should be removed by appropriate cleaning techniques, usually abrasive blast cleaning, prior to application of a coating system.

Surface Porosity
All surface porosities should be filled with an appropriate filler to provide a smooth surface.

Slag
All welding slag should be removed by mechanical means so that the underlying weld may be inspected and suitably prepared. Coatings should not be applied over welding slag.

Spatter
All weld spatter should be removed by mechanical means.

Undercuts
Undercuts should not be excessive or rough.

Welds
Welds should be continuous and free from sharp projections. See also the section on Welding Defects.

CORROSION TRAP



Description: Poor design resulting in a well where water can collect.
Comment: This problem should be eliminated wherever possible at the design stage/by including appropriate drainage holes or modifying the design to prevent areas where water or corrosive fluids can collect.

EDGES – FLAME CUT



Description: Sharp rough edges resulting from flame cutting.
Comment: All such rough cut edges should be ground smooth and any sharp edges radiused.A radius of 2 mm is generally recommended for good painting practice.

EDGES - SHARP



Description: Sharp edge on cut or constructional steel. Note in the second photograph how the coating becomes very thin over an untreated sharp edge.

Comment: Remove all sharp edges prior to surface preparation. A radius of 2 mm is generally recommended for good painting practice. Apply a stripe coat over all edges to ensure adequate coverage by the coating system.

MILL SCALE

Several photographs are included to show the effect of outdoor exposure on untreated rolled steel stock. The extent of degradation of the surface will depend on the type of exposure conditions, whether Rural Unpolluted, Industrial Polluted, or Marine.The examples included are purely to illustrate the various types of surface conditions which might be encountered.

The photographs on the following pages are from British Steel and show “A”, “B” and “C” quality steel surfaces and can be related to the appropriate quality designations included in the blast cleaning standards.

MILLSCALE – “A” QUALITY STEEL



Description: An example of steel with an "A" quality surface, showing fresh,tightly adherent mill scale.Note the overall blue oxide scale.

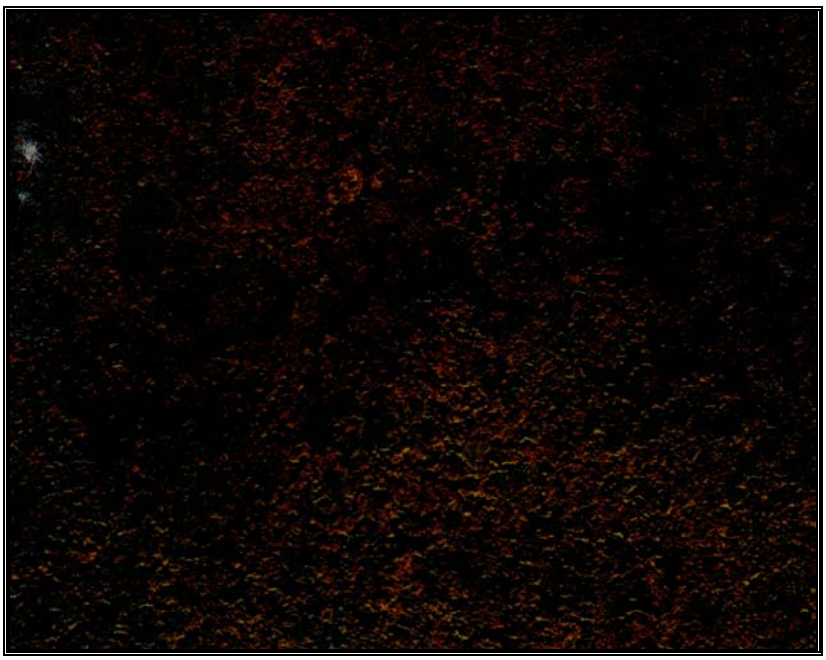


Description: A closer view of “A” quality steel with virtualy intact blue mill scale.

MILLSCALE - “B” QUALITY STELL



Description: An example of steel with a” B “ Tquality surface condition. The steel sections have been exposed to a Rural Unpolluted External atmosphere for a period of 2-3 months. The corrosion process has caused some degradation ofthe mill scale and a light patina of rust has formed on the steel surfaces.



Description: A closer view of “B” quality steel indicating delamination and corrosion effects of the mill scale.

MILLSCALE - “C” QUALITY STELL



Description: An example of a "C" quality surface condition. The steel sections have been exposed to a Rural Unpolluted External atmosphere for a period of 4 - 6 months. The corrosion process has caused total degradation of the mill scale and an overall patina of rust has formed on the steel surfaces.



Description: A closer view of “C” quality steel where practicaly all residues of mill scale have disappeared. Any remaining mill scale is in a friable state.

OIL CONTAMINATION



Descripton: Partial oil contamination of the surface with an oil film.
Comment: All oil and grease must be removed from the surface using solvent or biodegradable detergent degreasing priorto full surface preparation. Unless this is properly carried out, a residual oil film will be transferred to the surface during dry blast cleaning, which will prevent good adhesion of the coating system.

SKIP WELD

also internittent weld



Description: Non-continuous weld or skip weld.

Probable Causes: Used where a full weld is unnecessary for constructional purposes.

Repair: Ideally a continuous weld should be used.Where this is impractical/the gaps should be cleaned and filled with a suitable mastic to prevent bridging by the coating.

Comment: Unless the gaps are properly treated these areas will serve as initiation points for corrosion.

SLAG



Description: Weld slag which has not been removed from the surface.

Comment: Ail welding slag should be removed by mechanical means so that the underlying weld may be inspected and suitably prepared. Coatings should not be applied over welding slag.