

# Galvafacts

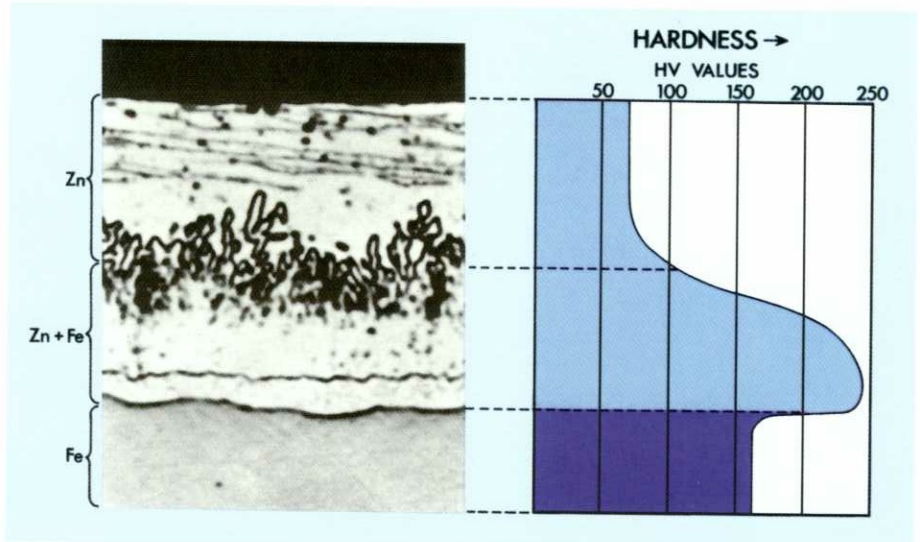
## Toughness and abrasion resistance

Toughness and good abrasion resistance of steel hot dip galvanized after manufacture is a major reason for the choice of galvanizing for many fabricated and semi-fabricated goods.

Galvanizing is unique: the process involves immersion in molten zinc which produces a coating which is bonded metallurgically to the steel. As a result, galvanized steel has excellent resistance to mechanical damage during handling, storage, transport and erection. This physical protection is many times greater than that afforded by other coatings including zinc-rich or other paints and is a vital factor where steelwork is to be shipped across the world.

The section through the galvanized coating shows the various iron/zinc alloys growing out of the steel base and covered by an outer layer of pure zinc in most galvanized coatings. The galvanized coating can be likened to a buffer stop. The soft outer zinc absorbs much of the shock of an initial impact and then the underlying iron/zinc alloys, which are harder than mild steel, prevent or greatly reduce the penetration of the coating and exposure of bare steel.

Tests show that if abrasion resistance for epoxy zinc-rich primers and most other conventional paints are taken as a base, polystyrene zinc-rich primers are 5 times better, zinc silicate primers 50 times better and hot dip galvanized steel 400 times better. The toughness of the galvanized coating makes it particularly suitable in situations where abrasion could be a problem either in assembly or in use. Conveyor systems, including buckets for quarried material and hoppers for coal wagons, are well suited. Galvanizing also limits the damage when spanners or other tools slip or when nuts



turn on a galvanized surface during tightening. While throwing or dropping galvanized steel is not recommended practice, the toughness of the coating does greatly simplify the handling of large heavy sections and reduces any remedial measures which are necessary. Even where base steel is exposed, the sacrificial corrosion protection properties of the galvanized coating then take effect to prevent unsightly and damaging rust.

Top: The hardness of the various layers are shown graphically alongside a microsection of the coating.

Below left: The soft pure zinc outer layer cushions any damage leaving the coating intact, as in this bridge beam which was hit by a lorry.

Below: Access covers are subject to pounding by heavy vehicles. They last for decades without rusting - illustrating well the abrasion resistance of hot dip galvanizing.



GA galvanizers  
association