

590

Effects of Alloying Elements on Liquid Zinc Embrittlement of HT590MPa Class Steel Plate

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HT590MPa

40

Synopsis :

In the hot dip zinc galvanizing process of a high strength steel plate, a crack occurs at the weld heat affected zone due to liquid metal embrittlement (LME). The crack is

function of chemical composition of the steel plate. If the value of R ($f_t=400$) is larger than 40%, no LME crack occurs. It is confirmed that Zr suppresses the hardenability, decreases the formation of coarse precipitates at grain boundaries, and increases the binding energy of the grain boundary.

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合金元素の影響*

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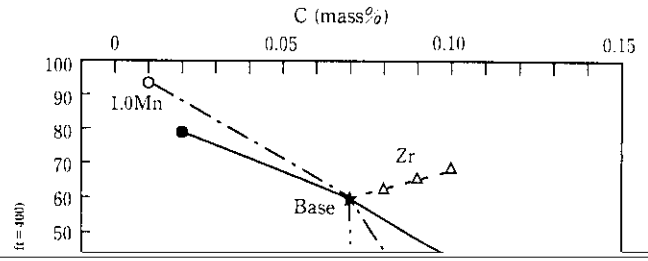
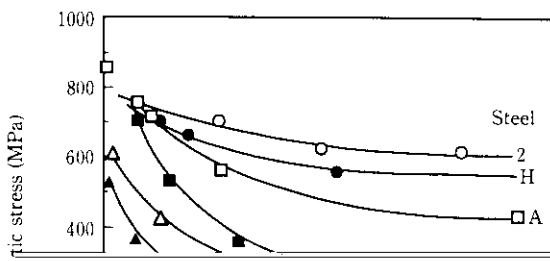
要旨

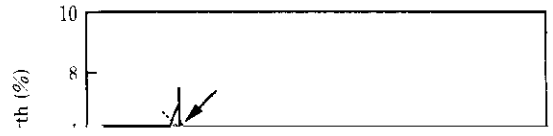
HAZ の液状亜鉛脆化試験を行い、合金元素の影響を調査した。HT590 MPa 鋼板の HAZ

Table 1. Chemical compositions of steel studied

	(mass%)													
	C	Si	Mn	P	S	Nb	V	Cu	Ni	Cr	Mo	Ti	Zr	B
Range	0.02 }	0.03 }	1.00 }	0.013 }	0.002 }	tr. }	tr. }	tr. }	tr. }	tr. }	tr. }	tr. }	tr. }	tr. }

Base	0.07	0.25	1.60	0.016	0.002	0.035	0.045	—	—	—	—	—	—	—
2	0.02	0.25	1.60	0.016	0.002	0.035	0.045	—	—	—	—	—	—	—
4	0.07	0.03	1.60	0.016	0.002	0.035	0.045	—	—	—	—	—	—	—
9	0.07	0.25	1.60	0.016	0.002	0.035	0.045	—	—	—	0.20	—	—	—
12	0.07	0.25	1.60	0.016	0.002	0.035	0.045	0.20	—	—	—	—	—	—





$$\cos(\theta/2) = \gamma_b / 2\gamma_{s-1} = \frac{760 \times 10^{-3}}{2 \times 185 \times 10^{-3}} \text{ to } \frac{760 \times 10^{-3}}{2 \times 105 \times 10^{-3}}$$

Specimens

test specimens

Increase in embrittlement caused by

界結合力が弱められ、引張応力の付加で容易にき裂が発生する。さらに、粒界近傍に粗大炭化物が存在したり、粒内が硬化して粒界へ