



## BRIDGE TECHNICAL DIRECTION BTD2007/13

### ***DURABILITY OF STEEL PILES IN CONTACT WITH ACID SULFATE SOILS***

#### **Background**

The rates of corrosion of unprotected steel piles are specified in Clause 9.4 of AS 5100.3 and in Table 6.4 of AS 2159. Neither of these two Australian Standards include specific requirements for piles in acid sulfate soils (ASS) or potential ASS.

#### **Information**

The following are the minimum corrosion allowances for unprotected steel piles and any other steel structural members e.g. anchors, with a design life of 100 years in ASS and potential ASS related to the estimated long term pH values from the bridge site investigations:

##### Minimum corrosion allowances on each steel surface

pH range	Soil condition A	Soil condition B
$\text{pH} \leq 4.0$	Not permitted	Not permitted
$4.0 < \text{pH} \leq 4.5$	4.0 mm	3.0 mm
$4.5 < \text{pH} \leq 5.0$	3.5 mm	2.75 mm
$5.0 < \text{pH} \leq 5.5$	3.0 mm	2.5 mm
$5.5 < \text{pH} \leq 6.0$	2.5 mm	2.0 mm
$6.0 < \text{pH} \leq 14$	2.0 mm	2.0 mm

Soil conditions A and B are as defined in Table 6.3 of AS 2159 – *Piling – Design and Installation*. Soil condition A applies to high permeability soils below groundwater level. Soil condition B applies to low permeability soils or all soils above groundwater.

Where high sulfate levels exist in the soil, sulfate reducing bacteria may be present leading to microbiologically induced corrosion. In such cases an appropriate additional corrosion allowance shall be assumed in the design.

#### **Bridge Technical Direction**

In designs for RTA bridges or for bridges that will become the property of RTA, steel piles must not be used in acid sulfate soils or potential acid sulfate soils where the measured or potential pH of the soil is  $\leq$

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4.0. In soils with measured or potential pH > 4.0 and sulphate levels less than 400 mg/l, the minimum corrosion allowances above must be provided to each surface.

**Effective date:** 17/12/2007

**Approved:** **Wije Ariyaratne**  
**Principal Bridge Engineer**

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