

**MAB1033 Structural Assessment and Repair**  
**EXAMPLES OF CONDITION RATING SYSTEM**

**Types of Investigation**

Investigation type code	Description
1	Alkali-silica reaction
2	Chloride contamination
3	Carbonation
4	Corrosion of reinforcement/prestressing cables
5	Structural steel paintwork
6	Accidental damage
7	Spalling of masonry, brick or concrete
8	Chloride ion levels in reinforced concrete decks before waterproofing or on re-waterproofing

**Damage to Concrete Surface**

category	Description
0	No damages
1	Deterioration of cement crust or of thin layers of concrete cover, without any voids
2	Deterioration of thin layers of concrete surface up to 1 mm deep, thin scars in concrete surface, partly loose fine sand grains
3	Heavier deterioration of concrete surface layer up to 4 mm deep, scars in concrete surface, loose larger sand grains
4	Damages of concrete surface up to 10 mm deep, loose large sand grains, scaled cement mortar between grains
5	Cracks in concrete cover along reinforcement, rust products along reinforcement
6	Delamination of concrete cover, revealed reinforcement

### Damage due to Reinforcement Corrosion

category	description
0	No corrosion
1	Light corrosion on the surface (air corrosion), average depth of corrosion < 0.1 mm (depth of pitting excluded)
2	Light to medium corrosion, thicker layers of corrosion products, average depth of corrosion is between 0.1 mm to 0.3 mm (depth of pitting excluded)
3	Heavy corrosion, thick detached layers of corrosion products, average depth of corrosion is between 0.3 mm to 1 mm (depth of pitting excluded)
4	Very heavy corrosion, thick detached layers of corrosion products, average depth of corrosion is greater than 1 mm (depth of pitting excluded)
5	Very heavy corrosion with thick detached layers of corrosion products, average depth of corrosion is greater than 1 mm (depth of pitting excluded), the cross section of the reinforcement is significantly reduced

### Degree of Damage

Code	Description
1	Slight damage/deficiency, no action required
2	Medium damage/deficiency, action needed during next 4 - 10 years
3	Serious damage/deficiency, action during the next 1-3 years
4	Critical damage/deficiency, immediate action required or within ½ year at the latest
9	Not inspected

### Extent of Damage

Extent	Description
A	No significant defect
B	Slight, not more than 5% of length or area affected
C	Moderate, 5 to 20% affected
D	Extensive, more than 20% affected

### Severity of Damage

Severity	Description
1	No significant defects
2	Minor defects or of a non-urgent nature
3	Defects which shall be included for attention within the next annual maintenance programme
4	Severe defects where urgent action is needed

### Description of Condition Rating

Condition rating	Description
Good	Element is limited to only minor problems
Fair	Structural capacity of element is not affected by minor deterioration , section loss, spalling, cracking or other deficiency
Poor	Structural capacity of element is affected or jeopardized by advanced deterioration, section loss, spalling, cracking or other deficiency

### Overall Condition Rating

Condition rating	Description
N	Not applicable
9	Excellent condition
8	Very good condition - no problems noted
7	Good condition - some minor problems
6	Satisfactory condition - structural elements show some minor deterioration
5	Fair condition - all primary structural elements are sound but may have minor section loss, cracking, spalling, or scour
4	Poor condition - advanced section loss, deterioration, spalling, or scour
3	Serious condition - loss of section, deterioration, spalling or scour have seriously affected primary structural elements. Local failures are possible. Fatigue cracks in steel or shear cracks in concrete may be present.
2	Critical condition - advanced deterioration of primary structural elements. Fatigue cracks in steel or shear cracks in concrete may be present or scour may have removed substructure support. Unless closely monitored it may be necessary to close the bridge until corrective action is taken.
1	Imminent failure condition - major deterioration or section loss present in critical structural components, or obvious vertical or horizontal movement affecting structure stability. Bridge is closed to traffic but corrective action may put bridge back in light service.
0	Failed condition - out of service; beyond corrective action.

### Recommended Work

Work	Description
A	Add (new items to be provided, e.g. waterproofing)
B	Item present but not inspected
C	Change (e.g. replacement of a defective bearing or parapet)
P	Paint
N	No action at present, monitor only
R	Repair/maintain (repair to concrete, clean grease, rod etc....)
S	Silane impregnation