Remediation Guideline
REV 0

Asset: ROM STRUCTURE (ROM 2)
Location: Grizzly Bridge

Defect Description:	• The 250UC steel cross bracing is heavily corroded and visibly deformed. • Bracing is considered unserviceable and no longer providing adequate structural restraint.
Repair Required:	• Full removal and replacement of affected cross bracing with new steel bracing of equivalent dimensions, installed to match original support pattern.
Reference Drawings:	• J718MCA001-3 • J718MCA002-3

DEFECT INFORMATION

Risk Rating
Extreme – E19
Asset
ROM 2
Location
Midspan cross bracing between main girders on ROM 2 – Grizzly Bridge.

DEFECT INFORMATION - PHOTOS

DEFECT INFORMATION - PHOTOS

PRE-WORK SAFETY & SITE SETUP

All work must comply with the site Health and Safety Management System (HSMS), the Job Safety Analysis (JSA) completed for the task, and all site-specific permit systems including hot work and isolation requirements. The site supervisor is responsible for ensuring that PPE, isolations, access, and emergency procedures are in place before work begins.

Permits Required (minimum):

- Hot Work Permit
- Isolation Permit
- Height Work Permit

Structural-Specific Safety Requirements

- Secure temporary lifting or restraint systems before loosening any bolts to prevent uncontrolled movement of the bracing.
- Bracing changes may temporarily affect structural stiffness; do not remove more than one bracing member at a time unless engineered support plans are in place.
- If connection areas show unexpected deformation, cracking, or movement when load is transferred, stop work and escalate to engineering.

Pre-Work Setup Steps

- Review the job JSA and obtain all required permits, including hot work (cutting/grinding)
- Verify that the work zone is isolated in accordance with site procedures.
- Inspect and confirm lifting/temporary support equipment is rated, tagged, and fit for purpose.
- Measure and record existing bracing length, bolt spacing, and connection geometry before removal.
- Confirm access are safe, level, and inspected.
- Set up exclusion barriers and warning signage as required by site protocols.
- Ensure abrasive blasting, cutting, lifting, and installation tools are operational.

PPE REQUIREMENTS

Standard site PPE is mandatory: hard hat, safety boots, gloves, high-visibility clothing, and safety glasses.

Specialised PPE required

- P2 dust mask/respirator
- Hearing protection
- Welding/cutting helmet with correct shade
- Cut-resistant gloves

SPECIFIC COMPETENCIES, KNOWLEDGE AND SKILLS REQUIRED

The work must be completed by competent personnel with the following minimum capabilities:

Trade Qualifications

- Certificate III in Engineering – Fabrication Trade (MEM30319) or equivalent qualification in metal fabrication/steel construction.
- AS/NZS 1554.1 qualification in the General Purpose (GP) category as a minimum requirement.
- Dogging or Rigging (DG/RG) licence for personnel involved in lifting, slinging, or directing loads.
- Construction White Card (CPCWHS1001) – mandatory for all workers on construction/mining sites.

Knowledge of Safety & Regulations

- Working knowledge of AS 4100 (Steel Structures) and AS/NZS 1554.1 fundamentals (as applicable to bolted connections).
- Awareness of mining site HSMS/JSA processes, hot work permit requirements, and exclusion zone rules.

TOOLING AND EQUIPMENT REQUIRED

Removal Equipment
Scaffolding
Lifting equipment: chain blocks, slings, or rated lifting lugs
Impact wrench or spanner set
Angle grinder with 180 mm cutting discs
Cold-cut saw or reciprocating saw (optional)
Wire brush/wire wheel
Installation Equipment
Magnetic drill
Calibrated torque wrench
Steel clamps
Pry bars and drift pins
Abrasive blasting unit
Coating applicators (brush/spray gun)
Welding machine (MMAW preferred for field)
3.2 mm or 4.0 mm electrodes
Welding leads/earth clamp
Angle grinder for weld prep
Welding screens

Measurement & Verification Tools
Tape measure and steel rule
Vernier calipers for bolt hole checks
Spirit level or digital inclinometer
Paint pens/markers for layout marks

MATERIAL LIST		
Item	**Dimensions**	**Quantity**
250UC cross bracing AS 3679.1 Grade 250/300	Match existing length	Determined onsite based on number of bracings requiring replacement
Hilti HAS-U Anchor Rods and Hilti HIT-RE 500 V4 adhesive	Embedment depth and diameter per original design	Determined onsite
Non-shrink Cementitious Grout Fosroc Class A, shrinkage compensated grout	Match existing length	Determined onsite by manufacturer's Product Data Sheet
Coating System (follow site-approved system) • Products below are examples only: Primer: Zinc-rich epoxy primer (e.g., Jotun Jotamastic 87, Dulux Durebild ZP). • Intermediate coat: Epoxy build coat (e.g., Intergard 475 • Topcoat: Polyurethane topcoat (e.g., Hardtop XP).	Match existing length	Determined onsite by surface area and manufacturer's Product Data Sheet
Structural bolts, nuts, washers AS/NZS 1252 Class 8.8/10.9	Match existing bolt joints	Replace all removed bolts with new bolts
Welding Electrodes AS/NZS 2203 E4803 Products below are examples only: • CIGWELD Austarc 13/45 • BOC Murex 4803 • Bohler FOX EV50	Match existing length	Determined onsite by surface area and manufacturer's Product Data Sheet

ESCALATION PROCESS

When the standard repair cannot proceed safely or as planned, work must be stopped and engineering support must be sought.

When to Escalate

Structural Concerns

- Unexpected movement or deflection of girders when bracing is removed.
- Connection plates cracked, buckled, or excessively thinned.

Site Constraints

- Access limitations preventing safe lifting or alignment.

Material Issues

- Bolt holes excessively enlarged or misaligned beyond safe tolerance.
- Replacement bracing not available in the correct size or grade.

Procedural Deviations

- Cannot achieve clean, blast-prepared surface at connection areas.
- Replacement bracing cannot be installed to required alignment.

Escalation Process

1. STOP WORK immediately if any trigger is met.
   - Email: repairs@mincka.com.au
2. Provide required information (below).
3. Wait for engineering response before proceeding.

Information Required for Engineering Review

- Minimum three photos from different angles with scale reference.
- Dimensional measurements: bolt spacing, bracing length, connection thickness.
- Description of issue preventing standard repair.
- Access limitations or environmental constraints.
- Supervisor name, phone, and email.
- Urgency level (e.g., shutdown critical path).

DETAILED REPAIR PROCEDURE

Step 1: Removal

1. Secure the existing bracing using the designated lifting system before touching any bolts.
2. Remove bolts at both ends. If bolts are seized or heavily corroded, cut or drill them out.
3. Lower the bracing carefully to the laydown area without twisting or impacting surrounding areas.

Acceptance Criteria

- ✓ All bolts and fixings fully removed, with no damaged fastener fragments left in connection holes.
- ✓ Work area left clean and free of loose debris.

Step 2: Cleaning

1. Mask off all surrounding areas using fire-retardant sheeting to prevent abrasive media spread.
2. Abrasive-blast connection areas until clean, light-grey metal is exposed on girder faces and bracing connection points.
3. Visually inspect all blasted surfaces
4. Keep the cleaned surfaces dry to prevent flash rusting until installation.

Acceptance Criteria

- ✓ Connection surfaces show clean, light-grey/white metal with no visible rust, old coating or blasting residue.
- ✓ Surface texture is uniformly rough (fine-sandpaper feel) to support coating adhesion.

Step 3: Installation (Bracings Connected to Girders)

1. Trim new bracings to the same length as the removed piece (±2 mm).
2. Drill bolt holes to match the existing support hole pattern exactly.
3. Perform structural fillet weld (all around component perimeter/plate) per AS/NZS 1554.1 GP.
4. Lift the new bracing into position and align bolt holes using drift pins if necessary.
5. Apply lubricant to bolt holes and insert bolts. Tighten evenly using calibrated torque wrench until plates sit firm against supports (all bolts torqued to AS 4100 specifications).

Acceptance Criteria

- ✓ Bolt holes aligned correctly; all bolts installed and torqued to AS 4100 requirements.
- ✓ No bracing twist, bowing, or misalignment when viewed from both ends.
- ✓ Welds are continuous around full perimeter.
- ✓ No visible weld defects (no porosity, no undercut, no cracks, no lack of fusion).

Step 4: Installation (Bracings Anchored to Wall)

1. Follow Step 3 for the end connected to the girder.
2. For the end connected to the girde, drill bolt holes to match the existing support hole pattern exactly.

DETAILED REPAIR PROCEDURE
3. For the end anchored to the wall, mark and drill new anchor holes through the baseplate, ensuring hole spacing from any old or abandoned holes in the concrete wall.
4. Drill holes to the required diameter and depth for Hilti HAS-U anchors as per Hilti technical data sheet.
5. Clean each hole thoroughly using the blow–brush–blow method
6. Inject Hilti HIT-RE 500 V4 adhesive from the bottom of each hole and insert HAS-U anchor rods as per Hilti technical data sheet.
7. Fill gap between baseplate and wall with grout to create a solid bearing surface.
8. Set final bolt tension using a calibrated torque wrench to AS 4100 requirements.
Acceptance Criteria ✓ New anchors installed at correct embedment depth and spacing, with no reuse of previous holes. ✓ Chemical adhesive fully cured before loading (checked against ambient temperature table). ✓ Baseplate correctly spaced from the wall, with no contact on old hole locations. ✓ Grout fully fills the gap beneath/behind the baseplate with no voids visible. ✓ Final bolted connection tight, aligned, and free from visible rotation or movement.
Step 4: Protective Coating
1. Wire-brush all areas affected by works, including newly drilled holes and blasted areas.
2. Apply primer immediately after cleaning to avoid flash rusting, following manufacturer's Product Data Sheet.
3. Apply the complete coating system with overlap onto existing coating to ensure a continuous barrier.
Acceptance Criteria ✓ Coating thickness appears uniform with no sagging, runs, or pinholes. ✓ Coating overlaps existing system cleanly and forms a continuous protective barrier.

INSPECTION

A competent person (site supervisor or structural engineer, per site requirements) must confirm:

Structural Inspection

- Cross bracing installed to correct length and alignment.
- All bolts torqued to AS 4100 specifications.
- Structural bolts properly seated, tensioned, and undamaged.
- No visible distortion or movement of connected girders.

Weld Inspection

- Fillet weld size correct
- Weld continuous around full perimeter
- No cracks, porosity, undercut
- Weld smooth and suitable for coating
- Weld inspected by competent person

Coating Inspection

- Coating system continuous and defect-free.
- All surfaces coated to required DFT.
- No missed areas, pinholes, or premature rust.

General Completion Checks

- Temporary supports removed only after verifying load transfer.
- Work zone clean and free of hazards.

LABOUR COST – PER DEFECT		
Labour	**Hours**	**Total Cost**
General Labour	20	$ 1,100
Tradesman Labour	24	$ 1,560
Painter Labour	12	$ 720
Sandblasting Labour	8	$ 560
Rigger Labour	24	$ 1,800
Dogger Labour	16	$ 1,120
Boilermaker Labour	12	$ 780

COSTS SUMMARY – PER DEFECT		$ AUD
Material Cost	**$**	**3,510**
Indirect Material Cost	**$**	**3,300**
Labour Cost	**$**	**7,640**
Indirect Labour Cost	**$**	**764**
Total Cost	**$**	**15,314**