



## CHECKLIST · SHUTDOWN PLANNING

# Shutdown Weld Repair Scope Checklist

Confirms a weld repair is defined well enough to be priced, planned and released inside a shutdown window, before the scope goes to contractors.

**FOR** Maintenance planners, shutdown coordinators and reliability engineers on mine, quarry and process plant, and the contractors who price the work.

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4

## HOW TO USE THIS CHECKLIST

Work through it while the scope is still on paper, at least one planning cycle before the shutdown. Mark each item Y, N or N/A and note the evidence you sighted. Every N is closed before the scope is issued, or written into the scope as an assumption, a hold point or an exclusion.

## KEY

**HOLD POINT**

Work stops until it is released.

☐

Y

☐

N

☐

N/A

Every N gets a note.

**Abbreviations** NDT non-destructive testing · MT magnetic particle testing · PT penetrant testing · UT ultrasonic testing · WPS welding procedure specification · PQR procedure qualification record · ITP inspection and test plan · OEM original equipment manufacturer · GP / SP general purpose / structural purpose weld categories

## JOB DETAILS

Project or shutdown

Site and asset (equipment number)

Component and defect location

Shutdown window (dates and hours)

Prepared by

Date

**1**

## BEFORE THE SHUTDOWN

## Defect characterisation

What is actually there, measured and recorded before anyone prices it.

| #   | ITEM                   | WHAT GOOD LOOKS LIKE / EVIDENCE TO SIGHT                                                                                | REFERENCE                        | Y                        | N                        | N/A                      | NOTES |
|-----|------------------------|-------------------------------------------------------------------------------------------------------------------------|----------------------------------|--------------------------|--------------------------|--------------------------|-------|
| 1.1 | Defect located         | Equipment number and component, the defect marked on a drawing or sketch, and a wide photo showing where it sits.       | Asset register<br>OEM drawing    | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |       |
| 1.2 | Defect sized by NDT    | Type, length, depth and orientation, by a named method and technician. MT and PT give length only. Depth needs UT.      | NDT report<br>AS/NZS<br>ISO 9712 | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |       |
| 1.3 | Repair history checked | Previous repairs here: when, how and with what result. A crack that returns at a repair means the cause is still there. | Maintenance and repair records   | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |       |

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BEFORE THE SHUTDOWN

## Defect characterisation continued

| #   | ITEM                       | WHAT GOOD LOOKS LIKE / EVIDENCE TO SIGHT                                                                                   | REFERENCE                     | Y                        | N                        | N/A                      | NOTES |
|-----|----------------------------|----------------------------------------------------------------------------------------------------------------------------|-------------------------------|--------------------------|--------------------------|--------------------------|-------|
| 1.4 | Parent material identified | Grade and thickness from the OEM drawing, a mill certificate or repair records. If unknown, state how it will be found.    | OEM data<br>AS 4100           | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |       |
| 1.5 | Special steels flagged     | Quenched and tempered plate, wear plate and castings identified. Each needs the maker's welding data, not generic preheat. | AS/NZS 1554.4<br>maker's data | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |       |

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BEFORE THE SCOPE IS ISSUED

## Cause and repair method

A repair that does not address the cause books the same job into the next shutdown.

| #   | ITEM                       | WHAT GOOD LOOKS LIKE / EVIDENCE TO SIGHT                                                                                      | REFERENCE                           | Y                        | N                        | N/A                      | NOTES |
|-----|----------------------------|-------------------------------------------------------------------------------------------------------------------------------|-------------------------------------|--------------------------|--------------------------|--------------------------|-------|
| 2.1 | Likely cause stated        | Fatigue, overload, impact, corrosion, weld defect or wear, with evidence. Like-for-like fatigue repairs usually crack again.  | Failure history<br>inspection data  | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |       |
| 2.2 | Method and options defined | Reweld, insert plate, re-detail or replace. Where the choice depends on what is found, price each option separately.          | Repair<br>procedure or design       | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |       |
| 2.3 | Design changes owned       | Inserts, doublers and stiffeners are design changes. Name the designer and reviewer. A doubler can worsen the fatigue detail. | AS 4100<br>Section 11<br>(fatigue)  | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |       |
| 2.4 | Weld category agreed       | GP, SP or fatigue category, complete penetration welds and NDT extent, from the drawing or agreed in writing.                 | AS/NZS 1554.1<br>Appendix D         | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |       |
| 2.5 | Lifting points excluded    | Lifting lugs, points and attachments are not repaired under a general scope. They go to an independent registered engineer.   | Site lifting<br>equipment procedure | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |       |

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BEFORE THE PLANT COMES DOWN

## Welding procedure and resources

Everything the crew needs is qualified, on site and booked before the shutdown starts.

| #   | ITEM                          | WHAT GOOD LOOKS LIKE / EVIDENCE TO SIGHT                                                                                   | REFERENCE                                  | Y                        | N                        | N/A                      | NOTES |
|-----|-------------------------------|----------------------------------------------------------------------------------------------------------------------------|--------------------------------------------|--------------------------|--------------------------|--------------------------|-------|
| 3.1 | WPS for each repair joint     | An existing WPS reference for each joint, or a note that one must be prepared and qualified before the shutdown.           | AS/NZS 1554.1<br>Section 4                 | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |       |
| 3.2 | Qualification route evidenced | Prequalified with a macro record, qualified by test with a PQR, or previous qualification. Procedure tests need lead time. | AS/NZS 1554.1<br>clause 4.2                | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |       |
| 3.3 | WPS states the actual joint   | Member and combined thickness the preheat was worked at, not a range, plus where, when and how preheat is measured.        | AS/NZS 1554.1<br>Section 5<br>AS ISO 13916 | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |       |
| 3.4 | Welders qualified             | Current for the process, position and procedure of each rostered welder. Site repairs are often vertical or overhead.      | AS/NZS 1554.1<br>clause 4.12               | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |       |

## 3

## BEFORE THE PLANT COMES DOWN

## Welding procedure and resources continued

| #   | ITEM                         | WHAT GOOD LOOKS LIKE / EVIDENCE TO SIGHT                                                                                | REFERENCE                | Y                        | N                        | N/A                      | NOTES |
|-----|------------------------------|-------------------------------------------------------------------------------------------------------------------------|--------------------------|--------------------------|--------------------------|--------------------------|-------|
| 3.5 | Consumables and repair steel | Classification and hydrogen rating, quantity, and drying or sealed packs on site. Insert plate with mill certificates.  | Maker's data AS/NZS 3678 | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |       |
| 3.6 | Equipment and NDT booked     | Calibrated or validated welding meters, preheat and temperature measurement, gouging gear, and NDT for each hold point. | AS/NZS ISO 3834          | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |       |

## 4

## CONFIRM WITH THE SITE

## Site interfaces

Confirm these with the site owner. Hazard controls come from the site's own safety system.

| #   | ITEM                              | WHAT GOOD LOOKS LIKE / EVIDENCE TO SIGHT                                                                              | REFERENCE                  | Y                        | N                        | N/A                      | NOTES |
|-----|-----------------------------------|-----------------------------------------------------------------------------------------------------------------------|----------------------------|--------------------------|--------------------------|--------------------------|-------|
| 4.1 | Access confirmed                  | Scaffold or elevating work platform: who supplies, erects and inspects it, and when.                                  | Site access procedure      | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |       |
| 4.2 | Isolations and permits identified | Isolation points, the permits needed (for example hot work, confined space, work at height) and who issues them.      | Site permit system         | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |       |
| 4.3 | Component prepared                | Product, grease and coatings removed at the repair, and supports or load removal so it is welded stable and unloaded. | AS/NZS 1554.1 clause 5.1.1 | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |       |
| 4.4 | Equipment protected               | Hoses, cables and seals protected. Work return lead placed so welding current does not pass through bearings or pins. | Repair procedure           | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |       |

## 5

## DURING AND AFTER

## Hold points, acceptance and handover

How the work is released, accepted and recorded, written down before the first arc.

| #   | ITEM                                         | WHAT GOOD LOOKS LIKE / EVIDENCE TO SIGHT                                                                                | REFERENCE                  | Y                        | N                        | N/A                      | NOTES |
|-----|----------------------------------------------|-------------------------------------------------------------------------------------------------------------------------|----------------------------|--------------------------|--------------------------|--------------------------|-------|
| 5.1 | Hold points in sequence<br><b>HOLD POINT</b> | Excavation with crack removal shown by MT or PT, fit-up and preheat, root or back-gouge, completion visual, final NDT.  | ITP                        | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |       |
| 5.2 | Release authority named                      | Who releases each hold point, by role, and how. Waivers are confirmed in writing.                                       | ITP                        | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |       |
| 5.3 | NDT method, extent, timing                   | Method and extent at each stage, any hold time before final NDT, and final NDT after all grinding and dressing.         | AS/NZS 1554.1 Section 7    | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |       |
| 5.4 | Trigger for scope growth                     | What is measured if the defect is larger than expected, who decides, and how extra work is approved before it proceeds. | Contract variation process | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |       |
| 5.5 | Handover records defined                     | Weld record (welder, WPS, consumable batch, preheat readings), NDT reports, photos and a marked-up as-built sketch.     | AS/NZS ISO 3834            | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |       |
| 5.6 | Long-lead items dated                        | Hours available in the window, the critical path, and order dates for plate, consumables, NDT and any procedure test.   | Shutdown schedule          | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |       |

#### COMMON GAPS WE SEE

### Where shutdown repair scopes usually fall short

#### 01 Crack length measured, depth guessed.

Surface methods give length only. Depth sets the excavation and the weld volume. Size it by UT before the shutdown, or price depth as a trigger.

#### 03 A procedure for a different steel.

Mild-steel procedures get used on quenched and tempered plate, wear plate or unidentified steel. Unlisted steel cannot be prequalified.

#### 05 Preheat on paper, not on the steel.

State where it is read, how long after the heat is removed, and with what. Tacks, dogs and strongbacks take the same preheat.

#### 02 Like-for-like on a fatigue crack.

The same detail rewelded is the same stress raiser, plus repair residual stress. Change the detail, or set the next inspection.

#### 04 Back-gouge dropped without evidence.

Omitting it on a two-sided complete penetration repair needs qualification evidence of root fusion (AS/NZS 1554.1 clause 4.5.2).

#### 06 Final NDT before the final grind.

If grinding follows the NDT, the finished surface was never inspected. Programme the final NDT after the last dressing pass.

#### SIGN-OFF

| ROLE                                          | NAME | SIGNATURE | DATE |
|-----------------------------------------------|------|-----------|------|
| Scope checked by                              |      |           |      |
| Reviewed by (engineering or maintenance lead) |      |           |      |
| Accepted for issue by (asset owner)           |      |           |      |

Signing records that each item was checked and the evidence sighted. It is not a certification of the work, and it does not replace the sign-offs your contract or site requires.

#### NEXT STEP

### Have the repair scope prepared for you

Veristruct prepares shutdown repair scopes, work packs, repair procedures and ITPs with hold points, from your drawings, photos and NDT reports. Fixed price for a defined scope, with two revision rounds included.

#### SERVICES Maintenance Project & Shutdown Support • Repair Engineering & Defect Response

*Veristruct prepares the full technical package and coordinates independent review and certification through registered engineering partners. Work in or for QLD, VIC, ACT or TAS is delivered with a registered engineer engaged before work starts.*

#### TALK TO

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Send the drawings, photos and NDT reports. You get a fixed-price quote for a defined scope.

#### IMPORTANT

General guidance only. It is not engineering advice for a specific asset and does not replace the drawings, the contract specification, the standards that apply, the site's own procedures or advice from a qualified person. Standards are named as pointers. Clause references are to AS/NZS 1554.1:2014. Work to the edition your contract names, read from your own licensed copy.

#### REVISION HISTORY

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