

Structural Steel Magnetic Drilling JHA

Worked instructional example

Work and worksite

A retrofit crew will cold-drill engineer-released connection holes in an existing stabilized building steel member from a protected stationary work platform. The selected magnetic-base drill, annular cutter and secondary retention must be suitable for the actual surface and operating orientation. This fictional learning example describes planned controls; it records no actual inspection or work authorization.

- The structural alteration release identifies the permitted hole locations, dimensions, sequence and any load/support restrictions.
- The actual steel thickness, surface condition, coatings and drill orientation must satisfy the selected equipment instructions; coating disturbance is released separately.
- This is partial coverage of steel modification/retrofit. Anchor-rod alteration, hot cutting, active welding on the member, unknown coatings and unapproved structural changes are excluded.

Questions before work

- Who releases the hole layout and maintains any structural load/support restrictions during drilling?
- Does this member surface and thickness meet the drill's adhesion and secondary-retention criteria?
- How will people be excluded from chips, the ejected slug and the opposite side of the hole?

Task Hazard Control

1 Release the structural alteration

Hazard: A wrongly placed hole or changed load path can weaken the member or disturb the supported structure.

Control: Retrofit lead compares the marked holes with the current engineer-released alteration and sequence. Confirm required support/load restrictions and coating condition; hold unmarked changes, unknown coatings or unresolved structural findings.

Verification: Lead and operator check member identity and the approved marks before tool placement.

Reasoning: Permission to install a connection is not permission to drill anywhere convenient.

2 Control access and the exit side

Hazard: An ejected slug or hot sharp chips can strike another worker or enter adjacent work.

Control: Establish protected operator access and close the chip/slug path and opposite face to others. Select a compatible capture or exclusion arrangement without obstructing the cutter; coordinate other work and keep required platform protection intact.

Verification: Area lead checks both faces and the potential falling-object path before setup.

Reasoning: The person exposed by the hole may be on the other side of the steel.

3 Inspect the drill and verify adhesion suitability

Hazard: An unsuitable magnetic surface or damaged retention can let the tool shift or fall.

Control: Operator inspects the drill, guards, cutter, leads and required safety chain/strap. Compare actual material, contact area, thickness and surface condition with this model's criteria; use only an approved clamping/retention solution and stop if suitability is uncertain.

Verification: Operator checks the model instructions, contact surface and secondary retention before motor use.

Reasoning: A magnet switching on does not prove adequate holding for the cut.

Complete the work and hand over

4 Set the tool in the permitted configuration

Hazard: Unplanned cutter or lubricant selection can cause tool failure; unsafe setup can expose hands to rotation.

Control: With the tool in its prescribed safe adjustment state, fit the approved cutter and arrange permitted lubricant/cooling for the operating orientation. Secure the tool and retention under instructions; route power and supplies away from access and rotating parts.

Verification: Operator verifies the setup and clears hands, loose clothing and accessories before starting.

Reasoning: Settings and accessories depend on the actual tool, cutter and workpiece.

5 Drill while monitoring stability

Hazard: Magnet lift, cutter binding or reaching into rotating swarf can cause entanglement and broken-tool injuries.

Control: Follow the selected model's operating method from the protected position. Keep hands and loose items clear of rotation and never clear chips while running; stop for lift, movement, abnormal cutting or lost power and reassess before restart.

Verification: Operator monitors tool contact and cutter response; attendant maintains the chip/slug boundary.

Reasoning: An automatic safety feature supplements active observation and secondary retention.

6 Stop collect residue and record the hole

Hazard: Residual rotation, hot chips or a loose slug can injure a worker during removal; an incorrect hole can be hidden by the next connection.

Control: Stop and isolate as required before clearing, changing or removing the tool, verifying rotation has ceased. Collect chips/slug with suitable tools and protection, document actual hole findings and refer discrepancies before connection installation.

Verification: Operator checks the cleared area; retrofit lead records hole acceptance actions and retained load restrictions.

Reasoning: Safe tool removal and structural acceptance are separate closeout tasks.

Pause and reassess

- Hole marks, member condition, coating identification or structural restrictions differ from the release.
- Magnet/retention suitability is uncertain or the tool lifts, shifts, binds or loses power.
- The protected platform, chip/slug boundary or stopped adjustment condition is lost.

Improve the controls

Needs improvement: The magnet is on, so drill.

More useful: Operator verifies actual thickness, surface, full contact and model-specific retention criteria before motor use and monitors contact throughout the cut.

Needs improvement: Brush off the chips while cutting.

More useful: Operator stops and establishes the prescribed safe adjustment condition before using suitable tools to collect chips; hands remain clear of rotating parts.

Decisions that change the analysis

Can the magnetic drill work while another crew welds on the same member?

That work is excluded here. Coordinate electrical and equipment interfaces and follow the actual drill instructions; do not assume magnetic adhesion and electronics remain suitable while welding occurs on the workpiece.

What must the crew record for actual use?

Record the engineer-released member/hole schedule, structural and coating restrictions, drill/cutter identity, actual adhesion/retention basis, operating orientation, both-side boundaries, observations and hole discrepancies. Do not invent feed speeds, thickness thresholds or structural acceptance.

Training needs

- Selected magnetic drill/cutter instruction, secondary retention, stopped adjustment and response to loss of adhesion or power.
- Crew instruction in structural alteration limits, protected access, chip/slug boundaries and coating/exposure findings.

Confirm applicable qualifications and actual training evidence for the people assigned. Related toolbox talks support discussion; they do not establish competence.

References and adaptation

Hougen Magnetic drill operator instructions
<https://www.hougen.com/opmanuals/OM920.pdf>

Hougen Magnetic adhesion and secondary retention
<https://hougen.com/faqs/>

OSHA 1926.300 Tool condition and guarding
<https://www.osha.gov/laws-regs/regulations/standardnumber/1926/1926.300>

References reviewed October 9, 2026. Use actual equipment and product instructions, project design and site requirements. This instructional example supplies no actual inspection results, signatures or work approval.