



Case Study

Quality & Asset Care

22-Cell Welding Operation

Metal Fabrication | AGAD Portal

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CLIENT OVERVIEW

Sector	Metal Fabrication — Structural & Precision Welded Components
Facility	Single-site manufacturing operation with 22 dedicated welding cells producing structural and precision fabricated components for industrial and commercial customers
Workforce	Multi-shift operation with welding operatives assigned across cells, supported by quality inspectors and a maintenance team responsible for all 22 cells and associated equipment
Challenge	No real-time visibility of weld quality, cell utilisation, or equipment condition across the 22-cell operation. Quality defects were identified late in the process. Maintenance was entirely reactive — equipment failed without warning, halting production and causing missed deliveries.
Solution	AGAD Portal deployed across all 22 welding cells — delivering live cell status, weld quality monitoring, asset condition tracking, digital inspection records, and a predictive maintenance framework built on real operational data

THE CHALLENGE

Running 22 welding cells is a complex operational undertaking. Each cell represents a significant capital asset. Each weld produced is a quality event. Each hour a cell sits idle or broken is revenue lost. For this metal fabrication business, all three areas — quality, utilisation, and maintenance — were being managed with limited visibility and no real-time data.

We had 22 welding cells and genuinely did not know, at any given moment, how many were running, how many were idle, or what state the equipment was in. When something broke, we found out because production stopped.

Quality — Defects Found Too Late

Weld quality inspections were carried out manually at the end of a production run or during post-process quality checks. By the time a defect pattern was identified — porosity, undercut, incorrect wire feed, inconsistent penetration — multiple components had already been processed through the same cell with the same issue.

- Re-work rates were higher than acceptable — rework consumed welder time that should have been productive
- Scrap components resulted in material waste and delayed order fulfilment
- Quality escapes occasionally reached the customer — damaging the client relationship and triggering costly returns and re-inspection processes
- There was no digital record linking a quality event to a specific cell, operator, date, or machine parameter — root cause analysis was slow and often inconclusive

Asset Care — Reactive and Costly

With 22 welding cells in continuous operation, equipment reliability was critical. Welding machines, wire feeders, torch assemblies, cooling systems, and positioning equipment all require regular

maintenance to perform consistently. Without a structured approach, maintenance was entirely reactive.

- Breakdowns occurred without warning — cells stopped mid-production, disrupting schedules and creating bottlenecks as work was redistributed
- Planned preventive maintenance (PPM) schedules existed on paper but compliance was inconsistent — tasks were deferred under production pressure
- No condition data was available from the welding machines — current draw, arc-on time, wire feed rate, and cooling system performance were unmonitored
- Maintenance history for each cell was held in paper job sheets — difficult to retrieve, incomplete, and useless for trend analysis
- Calibration records for welding parameters and inspection equipment were managed manually with no automated reminder or escalation system

Utilisation — No View of the Floor

Beyond quality and maintenance, the business had a third problem: they had no live view of how their 22 cells were being used. Management could not see, from anywhere, which cells were active, which were idle, and which were waiting for a job, a material delivery, or a maintenance intervention.

- Underutilised cells went unnoticed — supervisors could not identify idle cells quickly enough to redirect work
- Shift performance reporting was manual and end-of-shift — by which point the opportunity to act had passed
- Cell arc-on time — the most direct measure of productive welding output — was not tracked at all

BEFORE & AFTER

Before AGAD	With AGAD Portal
Weld quality inspections carried out manually at end of run — defects discovered after multiple components affected	In-process quality parameters monitored continuously — deviations flagged at the cell in real time before defects accumulate
No digital record linking quality events to cell, operator, date, or machine parameters	Every quality event linked to a specific cell, operator ID, shift, and weld parameter set — full traceability from inspection to root cause
Equipment breakdowns discovered when production stopped — no advance warning	Condition monitoring on all 22 cells — current draw, arc temperature, and wire feed anomalies trigger alerts before failure occurs
PPM schedules on paper — compliance inconsistent, tasks deferred under production pressure	Digital PPM schedule in AGAD — tasks assigned, tracked, and escalated automatically. Compliance visible to management in real time
No live view of cell status — managers unaware which cells were running, idle, or broken	Live cell status dashboard showing all 22 cells simultaneously — running, idle, quality hold, or maintenance

Arc-on time not tracked — no measure of productive welding output per cell or per operator

Arc-on time recorded per cell, per shift, per operator — the most direct measure of welding productivity, now visible and reportable

Calibration and inspection records held manually — no automated reminders or escalation

Digital calibration records in AGAD — due dates tracked, automated alerts sent before expiry, records linked to the cell asset

Maintenance history in paper job sheets — incomplete, hard to retrieve, no trend analysis possible

Full digital maintenance history per cell — work orders, completion times, parts used, and failure patterns available instantly

THE SOLUTION

AGAD Portal was deployed across all 22 welding cells in a phased rollout completed over four weeks. AGAD Gateway Servers were installed at each cell, connecting to the welding machine controllers, current measurement points, and operator input panels. No welding machines were replaced or modified — AGAD connected to the data that existing equipment was already generating.

The deployment addressed three distinct areas simultaneously: quality monitoring, asset care and maintenance, and cell utilisation — all feeding into a single operational platform visible to management, supervisors, the maintenance team, and quality.

Live Cell Status — All 22 Cells at a Glance

The central AGAD dashboard provides a live view of every cell on the floor — updated continuously. Each cell is shown in one of four states:

WC-01 Running On target	WC-02 Running On target	WC-03 Quality Hold Inspection req.	WC-04 Running On target
WC-05 Running On target	WC-06 Maintenance PPM due	WC-07 Running On target	WC-08 Running On target
WC-09 Running On target	WC-10 Idle Awaiting job	WC-11 Running On target	WC-12 Running On target
WC-13 Running On target	WC-14 Quality Hold Re-weld required	WC-15 Running On target	WC-16 Running On target
WC-17 Running On target	WC-18 Running On target	WC-19 Running On target	WC-20 Maintenance Unplanned stop
WC-21 Running On target	WC-22 Running On target		
■ Running ■ Quality Hold ■ Maintenance ■ Idle			

The grid is visible on a large display in the production office and accessible on any device. Supervisors can identify idle cells, quality holds, and maintenance issues at a glance — and act without leaving their desk.

How AGAD Connected and Delivered

1	Cell connection via AGAD Gateway Server An AGS unit was installed at each welding cell, connecting to the welding machine controller via Modbus or analog I/O. Data collected includes arc-on status, welding current, wire feed rate, voltage, duty cycle, and cell operational state.
2	Asset model built in AGAD Portal Each of the 22 cells was created as a named asset in the AGAD Portal, complete with its make, model, serial number, commissioning date, and associated documentation — manuals, calibration certificates, and weld procedure specifications (WPS).
3	Quality monitoring configured per cell Acceptable operating ranges for welding current, voltage, wire feed rate, and duty cycle were defined per cell and per weld procedure. Deviations from these ranges trigger an immediate quality alert — flagging the cell for inspection before the affected component leaves the station.
4	Digital PPM schedule and inspection checklists Planned maintenance schedules for each cell were built into AGAD — covering torch inspection, liner replacement, wire feeder service, cooling system checks, and tip/shroud replacement intervals. Digital inspection checklists are completed by the maintenance team on mobile devices and signed off against the cell asset.
5	Condition monitoring and predictive alerts AGAD monitors welding current draw and arc behaviour over time. Gradual changes in current profile — indicating liner wear, contact tip degradation, or cooling issues — generate early warning alerts to the maintenance team before the equipment fails or weld quality is compromised.
6	Calibration and certification management Calibration due dates for all cell-related instruments and inspection equipment are tracked in AGAD. Automated alerts are sent to the quality team ahead of expiry. Calibration certificates are stored digitally against the relevant cell asset — available instantly for customer audits or third-party inspection.

QUALITY MONITORING IN DETAIL

Weld quality in a fabrication environment is directly related to process consistency. When a welding machine operates within its defined parameters — the right current, the right wire feed rate, the right voltage — it produces consistent, repeatable welds. When parameters drift, quality follows.

AGAD makes parameter drift visible the moment it begins. Rather than waiting for a visual inspection at the end of a run, the system monitors welding parameters continuously and compares them against the defined acceptable range for the active weld procedure.

- If welding current drops outside the acceptable range, AGAD raises a quality alert at the cell and notifies the supervisor — prompting an immediate inspection before more components are processed
- If wire feed rate becomes erratic — often an early indicator of liner wear or feeder drive problems — AGAD flags it as both a quality and a maintenance concern simultaneously

- Every weld event is time-stamped and logged against the cell, the operator, and the active job — creating a quality record that links directly to the finished component if a query arises downstream
- Quality holds can be placed on a cell directly from the AGAD dashboard — changing its status to Quality Hold and notifying the quality team to attend for inspection

We used to find a batch of components with inconsistent welds and have no idea which cell made them, which shift, or what the machine was doing at the time. Now every weld has a data record behind it. Root cause analysis that used to take days takes minutes.

ASSET CARE IN DETAIL

With 22 cells in operation, the maintenance team's time is finite. AGAD helps them direct that time where it is most needed — and ensures that routine tasks are never missed.

Planned Preventive Maintenance

Each of the 22 cell assets in AGAD carries a full PPM schedule. Tasks are triggered by either calendar intervals or arc-on hours — whichever is more appropriate for the component being maintained. When a task falls due:

- The maintenance team receives an automated notification via the AGAD Portal and by email
- A digital work order is raised against the cell asset — describing the task, the required parts, and the expected duration
- The technician completes the work on site and signs off the job digitally, recording completion time, parts used, and any observations
- The cell's maintenance history updates automatically — building a permanent, searchable record of every service event

Condition-Based Alerts

Beyond scheduled maintenance, AGAD monitors the live health of each cell. Key indicators tracked include:

- Welding current profile — changes in current draw pattern indicate contact tip wear, liner fouling, or power source issues
- Duty cycle trends — a falling duty cycle over time can indicate torch overheating or cooling system degradation
- Wire feed consistency — irregular wire feed rate signals liner wear or drive roll issues before they cause weld defects
- Arc-on hours per cell — cumulative arc time drives service interval calculations more accurately than calendar time alone

When any monitored parameter trends outside its normal operating envelope, AGAD generates a maintenance alert — giving the team advance warning to schedule intervention before a breakdown or quality event occurs.

RESULTS

The impact of the AGAD deployment was measurable across all three areas within the first quarter of operation.

34%

reduction in weld rework and scrap rate — quality issues identified at the cell before components progress

41%

reduction in unplanned cell downtime — condition alerts enabled proactive intervention before breakdowns

22/22

cells now fully visible in real time — management has a live operational picture of the entire welding floor

Quality Outcomes

- Weld defect rate reduced significantly — in-process parameter monitoring catches process drift before it becomes a quality escape
- Customer returns due to weld quality eliminated in the months following deployment
- Root cause analysis time cut from days to minutes — every quality event has a complete data record attached
- Quality audit preparation simplified — digital inspection records, calibration certificates, and weld procedure compliance logs available instantly

Asset Care Outcomes

- Planned maintenance compliance increased from an estimated 55% to over 90% — digital scheduling and automatic reminders removed the reliance on memory and paper
- Two significant equipment failures averted through condition monitoring alerts — both would have caused full cell shutdowns lasting multiple shifts
- Maintenance team efficiency improved — technicians address the right cells at the right time rather than investigating breakdowns reactively
- Calibration compliance reached 100% — automated alerts ensure no certificate expires without the quality team being notified in advance

Utilisation Outcomes

- Arc-on time per cell increased across the facility — idle cells are now visible and supervisors act on them during the shift
- Cell utilisation data is now used in production planning — job allocation decisions are based on actual cell availability and performance history
- Shift performance reporting moved from manual end-of-shift tallies to automated, real-time data — management sees the shift as it happens, not after it ends

COMPLIANCE & AUDIT READINESS

For a metal fabrication business supplying industrial and commercial customers, the ability to demonstrate process compliance is increasingly important. Customers expect traceable quality records. ISO 3834 welding quality requirements, customer-specific weld procedure approvals, and third-party inspection all demand documented evidence.

AGAD provides that evidence as a natural by-product of daily operation — not as an additional administrative burden. For any cell, for any date, the quality team can produce:

- Weld parameter logs showing actual current, voltage, and wire feed rate against the approved weld procedure specification (WPS)
- Operator records linking each weld event to a named, certificated welder
- Inspection records and sign-offs for all quality checks carried out at the cell
- Calibration certificates for all measurement and inspection equipment, with validity status confirmed
- Full maintenance history showing PPM compliance, parts replaced, and any condition alerts raised and resolved

Our last customer audit took half a day. The auditor asked for records on three specific cells covering a six-month period. We had everything on screen within five minutes. Previously that same request would have taken us two days and a search through six months of paper files.

EXPANDING THE SOLUTION

Following the success of the initial deployment across the 22 welding cells, this client is now expanding the AGAD platform into adjacent areas of the operation:

- Cutting and forming equipment — applying the same asset monitoring and PPM framework to the laser cutters, press brakes, and folding machines that feed the welding cells
- OEE tracking — formalising the utilisation data already being collected into a full OEE calculation per cell and per shift, enabling structured continuous improvement
- Energy monitoring — connecting the welding machine power circuits to energy submeters to understand electricity consumption per cell and identify opportunities for efficiency improvement
- Document library — digitising weld procedure specifications, material test certificates, and operator qualification records into the AGAD document library, linked directly to the relevant cell assets
- Supplier integration — giving approved consumable suppliers visibility of wire and gas consumption data to enable more accurate delivery scheduling and reduce the risk of stock-outs

FIND OUT MORE

If your fabrication or manufacturing operation is managing quality, maintenance, and asset performance without real-time data, AGAD Portal can close that gap — quickly, without disrupting your production, and with measurable results from the first weeks of operation.

We offer a focused Proof of Concept deployment on a subset of your assets — giving you live data, real insight, and a clear picture of the wider opportunity before committing to a full rollout.

Get in touch

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