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# Digital SQCDP Board

The implementation of the use case "SQCDP Board" in *Visual Shop Floor* – for maximum transparency and operational excellence on the shop floor.

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# 1. Introduction

*Visual Shop Floor* is a modern no-code/low-code platform for digital shop floor management. With flexibly configurable features in the areas of data management, visualization, task management, shop floor meetings, and continuous improvement (CIP), production and logistics processes can be mapped agilely, monitored in real time, and systematically improved.

This document is part of the "*Visual Shop Floor –
Solution Blueprints*" series. It describes practical use cases, serves as a template for similar projects, and simultaneously illustrates the functionality of *Visual Shop Floor* in an industrial environment. The blueprint is therefore aimed equally at users, administrators, and decision-makers in the production domain.

This blueprint focuses on the use case "Digital SQCDP Board," which was successfully implemented as part of a customer project. The core topics of Safety, Quality, Cost, Delivery, and Productivity are represented through specific KPIs, events, and tasks, and are complemented by *Visual Shop Floor*'s dynamic event handling. This creates a continuous, transparent information base for operational control, daily shop floor meetings, and the continuous improvement process.
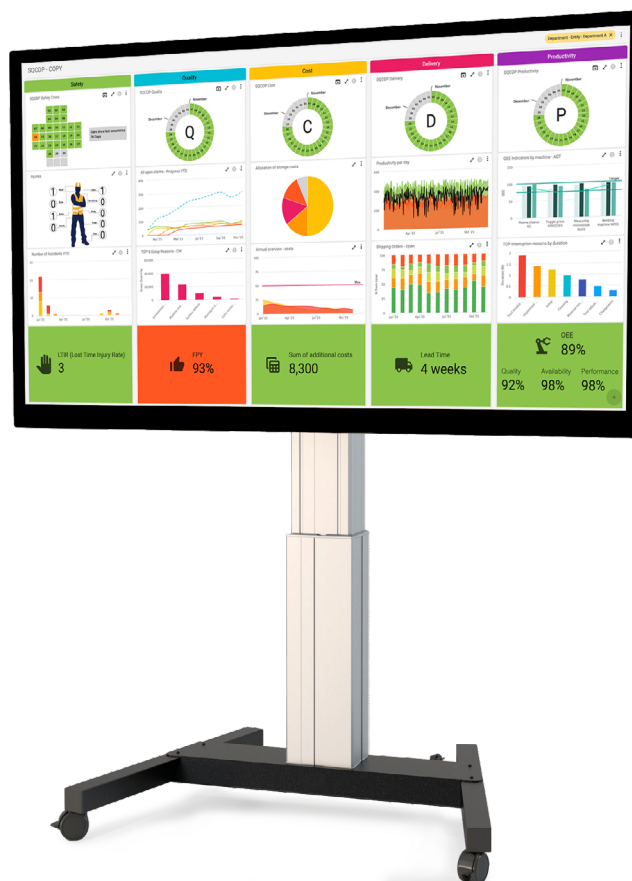


Fig. 1: Info Board with SQCDP dashboard – *Visual Shop Floor*

# 2. Background and initial situation

In the company under consideration, daily shop floor meetings were previously conducted based on analog SQCDP boards. Traditional whiteboards were used, supplemented by printed paper lists and handwritten notes. Metrics and KPI overviews were often prepared manually in Excel and then attached to the boards in paper form.

Updating the metrics for Safety, Quality, Cost, Delivery, and Productivity was time-consuming and characterized by frequent media breaks, which resulted in data that was sometimes outdated, incomplete, or inconsistent. Capturing and tracking deviations proved particularly challenging: although deviations were documented, they were often unstructured, delayed, or in some cases not recorded at all.

Responsibilities were rarely clearly defined, so follow-up actions were often not consistently tracked.

The shop floor meetings themselves also suffered from the analog workflow. Without a consolidated information base, team leaders relied on verbal reports, resulting in the need for extensive coordination, potential misunderstandings, and delays. Deviations were discussed, but only rarely translated systematically into actions or tracked sustainably.

Furthermore, a structured escalation process was missing, which would have enabled the timely involvement of management when needed. The result was a predominantly reactive rather than proactive approach to problem-solving.

Against this backdrop, there was a need for a digital solution that centrally captures key metrics, presents them visually, systematically maps events, and directly links them to tasks. The main challenges can be summarized as follows:

- **Manual and decentralized data collection without a central data foundation**
- **Media disruptions and lack of transparency**
- **Insufficient tracking of measures**
- **Lack of standardized meeting procedures**
- **No structured escalation logic**

Based on a requirements analysis, it was decided to implement the digital SQCDP board using *Visual Shop Floor*, as all functional and process-related requirements could be covered and modeled with full flexibility.

# 3. Requirements and objectives

An SQCDP board is designed to systematically and intuitively present the core themes of a production system. It forms the foundation for operational control and the evaluation of production and support processes. The objective is to continuously reflect performance in the areas of Safety, Quality, Cost, Delivery, and Productivity, visualize it transparently, and make deviations visible at an early stage.

Beyond that, an SQCDP board strengthens transparency and communication within the team. It creates a shared view of processes, goals, and priorities. Decisions become traceable, responsibilities are clarified, and employees' identification with company objectives is reinforced. In this way, the SQCDP board supports the development of a lived culture of continuous improvement.

A key prerequisite for the successful use of a digital board is a unified, reliable, and up-to-date data foundation from which KPIs can be derived consistently and in real time. This eliminates manual data preparation, avoids media disruptions, and significantly improves information quality.

In addition to visualizing current KPIs, capturing and mapping events is an essential component of an SQCDP board. Events such as workplace accidents (Safety), customer complaints (Quality), or schedule delays (Delivery) can be recorded systematically, assessed, and linked to targeted actions. This creates a central source of information that can be used both for operational decision-making and for further analysis.

In summary, the SQCDP board pursues four key objectives:

- **Transparency through real-time KPIs and structured event handling**

  The board makes performance, trends, and deviations immediately visible. KPIs and event data together form the foundation for fact-based decision-making.

- **Systematic task management**

  Tasks are captured, tracked, and completed in a structured manner. Responsibilities, due dates, and progress are visible at all times.

- **Efficient communication**

  All stakeholders access the same consolidated information base. Meetings become shorter, more focused, and more results-oriented.

- **Continuous improvement**

  Historical data, event analyses, and KPI trends enable the identification of causes, patterns, and opportunities for sustainable process optimization.

# 4. Solution approach for the implementation with *Visual Shop Floor*

*Visual Shop Floor* has been consistently developed following a no-code/low-code approach. Functions in the areas of data management, transparency, collaboration, and continuous improvement can be flexibly combined and precisely adapted to the specific use case. The modular, configurable system design allows for easy customization of user interfaces to different production processes and organizational structures.

For the implementation of the digital SQCDP board, the existing modules of *Visual Shop Floor* were purposefully configured to optimally support the previously defined requirements for transparency, real-time capabilities, and continuous improvement. At the core was an intuitive user interface specifically designed for large-format touchscreens on the shop floor. Particular emphasis was placed on clear KPI visualization, structured event capture, and seamless integration of existing data sources.

The central user interface is an interactive dashboard that visually represents the five core areas of Safety, Quality, Cost, Delivery, and Productivity. It combines KPI visualizations with event and task management. Drill-down functions provide access to detailed information and additional context. This creates a dynamic control system that combines operational transparency with data-driven decision-making.

The following components were used for the implementation:

- **Data collection and system integration:**
  Connecting relevant data sources (ERP, MES, CAQ, EHS, and machine data) via appropriate interfaces

- **Data preprocessing:**
  Cleaning, harmonizing, and contextualizing the data

- **Dashboard structure:**
  Column-based layout for the SQCDP focus areas

- **Event handling:**
  Capturing, categorizing, and prioritizing events

- **Data visualization and KPI widgets:**
  Real-time KPIs with drill-down functionality

- **Parameter:**
  Standardized SQCDP board with specific content

The following subsections provide a detailed description of these components.

## 4.1 Data collection and system integration

A key strength of *Visual Shop Floor* is the wide range of integrated data connectors, which allow information from different enterprise systems to be seamlessly integrated and consolidated. This creates a unified, connected, and up-to-date data foundation, enabling a transparent real-time view of all relevant production processes.

In this specific project, the goal was to establish a consistent and objective data basis on which the five focus areas Safety, Quality, Cost, Delivery, and Productivity could be reliably represented. Existing information from operational systems was automatically imported, such as data on production orders, quality inspections, downtime, or training. The existing systems remained unchanged, so no adjustments to operational processes were required. Instead, the data was captured automatically, consolidated, and made available in *Visual Shop Floor* for operational monitoring.

In the project, the following systems were integrated:

- **ERP system**

  Data on orders, material consumption, cost centers, and delivery dates were automatically imported via a REST interface. These form the basis for the focus areas of Cost, Delivery, and Productivity.

- **MES**

  Real-time data on production progress, equipment availability, scrap, and OEE were captured through an API integration. These data were primarily used for the areas of Quality, Delivery, and Productivity.

- **EHS system**

  The EHS system was connected via a REST API. Accidents, near-misses, and safety inspections are automatically recorded and made available centrally.

- **CAQ system**

  Test results, complaints, and audit findings are transmitted via defined API endpoints, enabling central documentation of internal and external quality deviations.

- **Machine and sensor data (OPC UA)**

  Machine and sensor data such as equipment downtime, cycle times, and energy consumption are captured directly via OPC UA and linked with contextual information (line, shift, order).

This comprehensive integration ensures that events and metrics are captured automatically, consistently, and in real time. Regardless of the source system, each piece of data is clearly assigned to one of the five SQCDP areas. This creates a reliable, always up-to-date, and holistic data foundation that serves as the basis for KPI calculations, event detection, and operational decision-making.
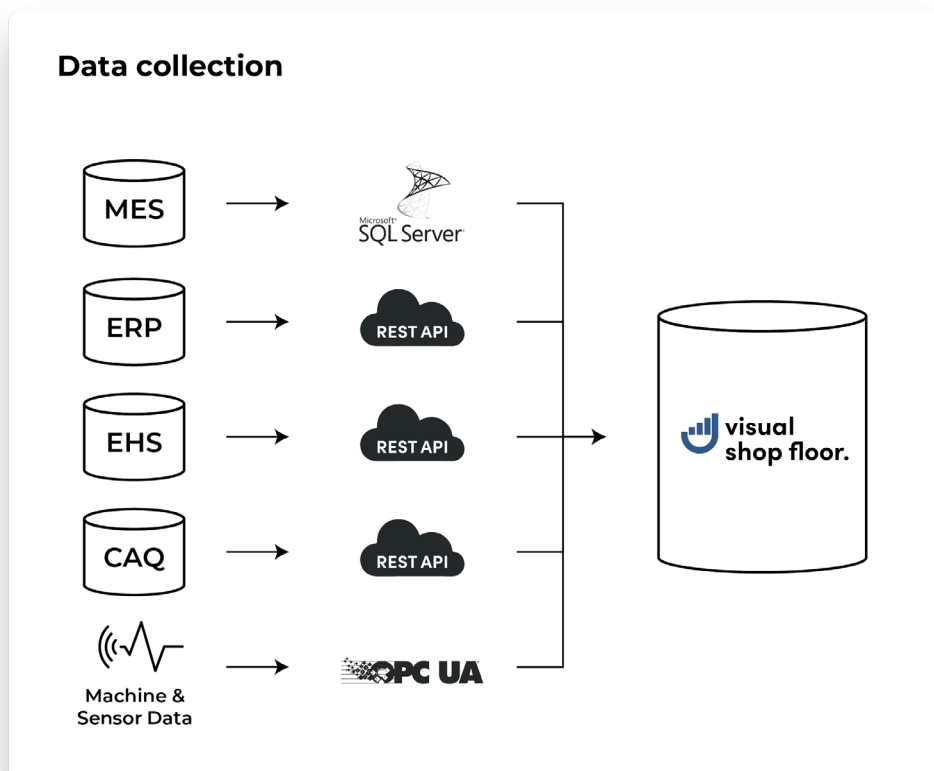


Fig. 2: Data collection – Infographic

# 4.2 Data preprocessing

The structured preparation of raw data forms the basis for meaningful KPIs and well-founded decisions. By cleaning, harmonizing, and contextualizing heterogeneous data sources, a consistent and reliable data foundation is created, enabling precise analyses and dependable real-time information.

*Visual Shop Floor* provides a stepwise processing pipeline in which raw data from various sources – machines, sensors, files, or interfaces – is technically prepared.

In the first step, data is converted into uniform formats, and erroneous or incomplete values are corrected. Subsequently, the data is harmonized and linked to establish relationships between information from potentially different sources and to place it within a common context.

Based on this foundation, application-specific KPIs can be derived – from basic metrics such as downtime or scrap rates to more complex indicators like OEE or CPK values. The goal is to create a consolidated data model that can be used both as the basis for real-time visualization and for historical analyses.

In the customer project, data from MES, ERP, CAQ, and EHS systems were integrated to provide a comprehensive representation of the production processes. The data was automatically retrieved at predefined intervals, cleaned and standardized through specific pipeline steps (user-definable functions), and linked using master data (orders, machine IDs, shifts). An overarching data validation process ensured that erroneous or duplicate records were identified and corrected.

Building on the prepared raw data, the transformation into concrete KPIs was carried out. Meaningful indicators were derived from continuously updated process values.

In parallel, anomaly and deviation detection was implemented using defined rule-based mechanisms. This allowed, for example, machine downtimes exceeding specified thresholds, clusters of quality deviations, or safety-relevant incidents to be automatically detected and recorded as structured events.

These events were categorized using thresholds and classification rules and enriched with additional contextual information such as causes, tasks, or responsibilities.

This resulted in a consistently structured and validated data foundation, which serves as the basis for real-time visualization on the SQCDP board and for event-driven actions in shop floor management.
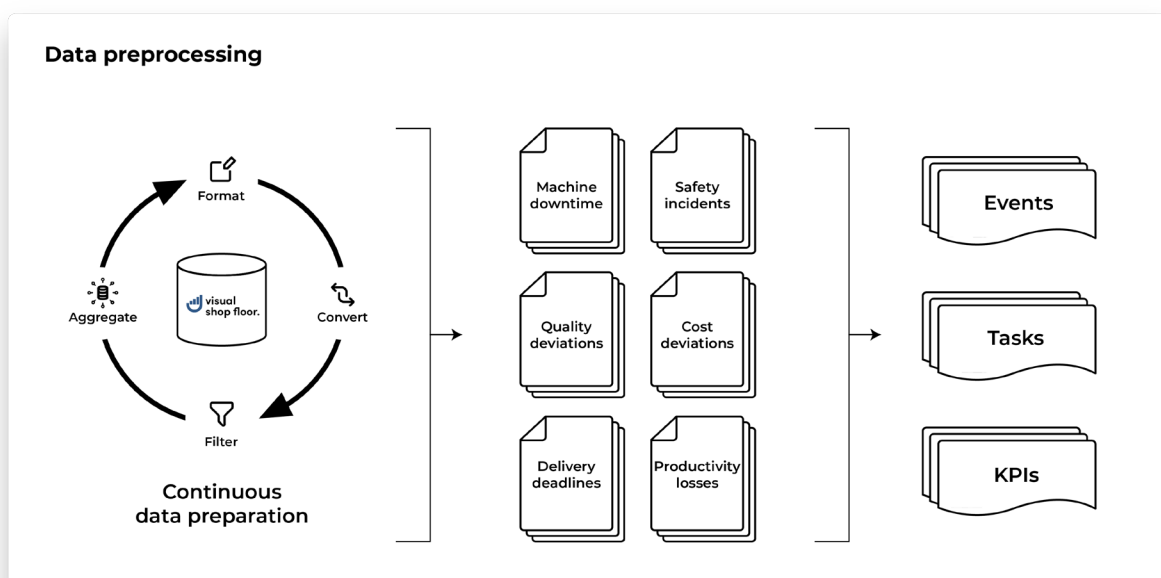


Fig. 3: Data preprocessing – Infographic

## 4.3 SQCDP Board user interface

*Visual Shop Floor* enables the creation of tailored user interfaces for different target groups and use cases through flexibly configurable dashboards. Layouts can be individually customized, widgets freely positioned, and content arranged to ensure intuitive use and alignment with the specific purpose.

A wide range of components is available – from interactive charts and KPI widgets to event and task elements, as well as the display of documents, images, or videos. In addition, input widgets can be used to capture data directly within the dashboard, centrally consolidating KPIs, events, and tasks.

Thanks to the no-code/low-code approach, layouts, data sources, and widgets can be adjusted without programming skills. This allows user interfaces to be quickly adapted to new requirements,

increasing user acceptance while ensuring that all relevant information is displayed in real time and in the correct context.

Based on this, the digital SQCDP board was implemented with *Visual Shop Floor*. The dashboard consolidates all information from the five focus areas Safety, Quality, Cost, Delivery, and Productivity on a central interface and serves as a daily control and analysis tool. It forms the basis for regular shop floor meetings, supports monitoring of production performance, and creates a shared understanding of the current situation.

The flexible design options allowed for precise adaptation to the company's requirements. Each focus area was individually defined, structured, and linked to the relevant KPIs, charts, and event information. This resulted in an intuitive and consistently structured user interface, enabling rapid comprehension and interpretation, and supporting data-driven decision-making in the daily production environment.



Fig. 4: Dashboard „SQCDP Board" – *Visual Shop Floor*

## 1. Column layout and display of SQCDP focus areas

For the digital SQCDP board, a column-based dashboard layout was chosen. The number and labeling of columns can be flexibly adjusted. This layout is particularly suitable for the structured visualization of the five focus areas.

The following columns were defined for the implementation:

- **Safety:** Accidents, safety incidents, lost work time
- **Quality:** Scrap, rework, customer complaints
- **Cost:** Material, energy, and process costs
- **Delivery:** On-time delivery, delivery performance, lead times
- **Productivity:** Productivity metrics (e.g., output quantity, shift performance)

The clear visual arrangement provides an intuitive overview and supports a shared understanding of the current performance status across all areas.
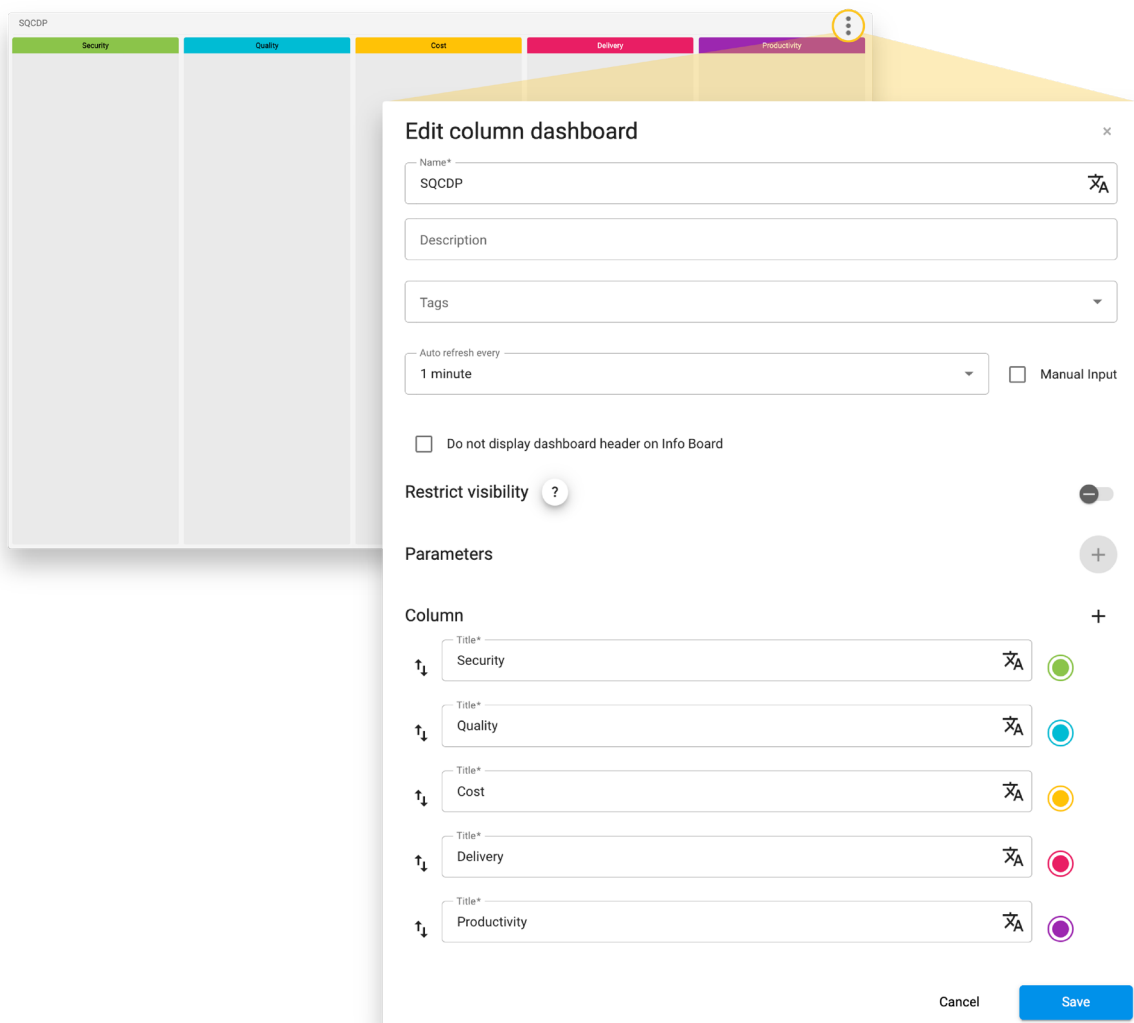


Fig. 5: Column layout SQCDP – *Visual Shop Floor*

## 2. Safety cross and event wheels

To provide a structured representation of events, specific visualizations were added for each column:

- A safety cross is used for Safety.
- Event wheels are used for the other areas.

The visualizations display the days of the current month, color-coded according to a traffic light system:

- Green – no incident
- Yellow / Orange / Red – Deviations of varying severity

This logic enables immediate visual assessment, supports prioritization, and enhances team communication.
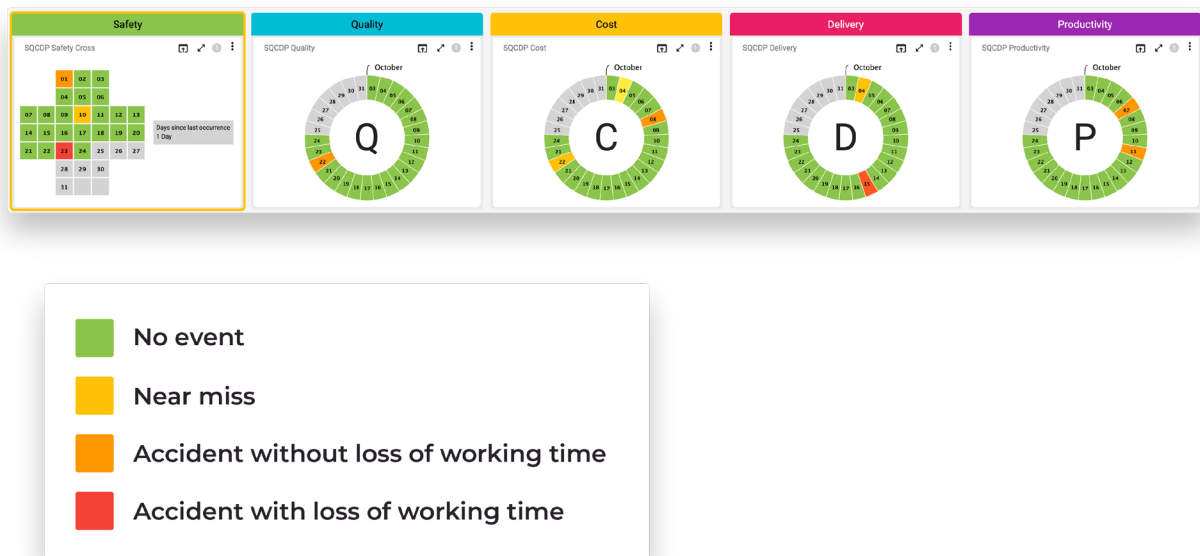




Fig. 6: Traffic light system for events – *Visual Shop Floor*

By clicking on a color-coded day field, a detailed view opens, displaying all events of that day in chronological order – including timestamp, event type, affected machine/line, and any immediate measures taken. The status of related tasks (open, in progress, completed) is also visible.
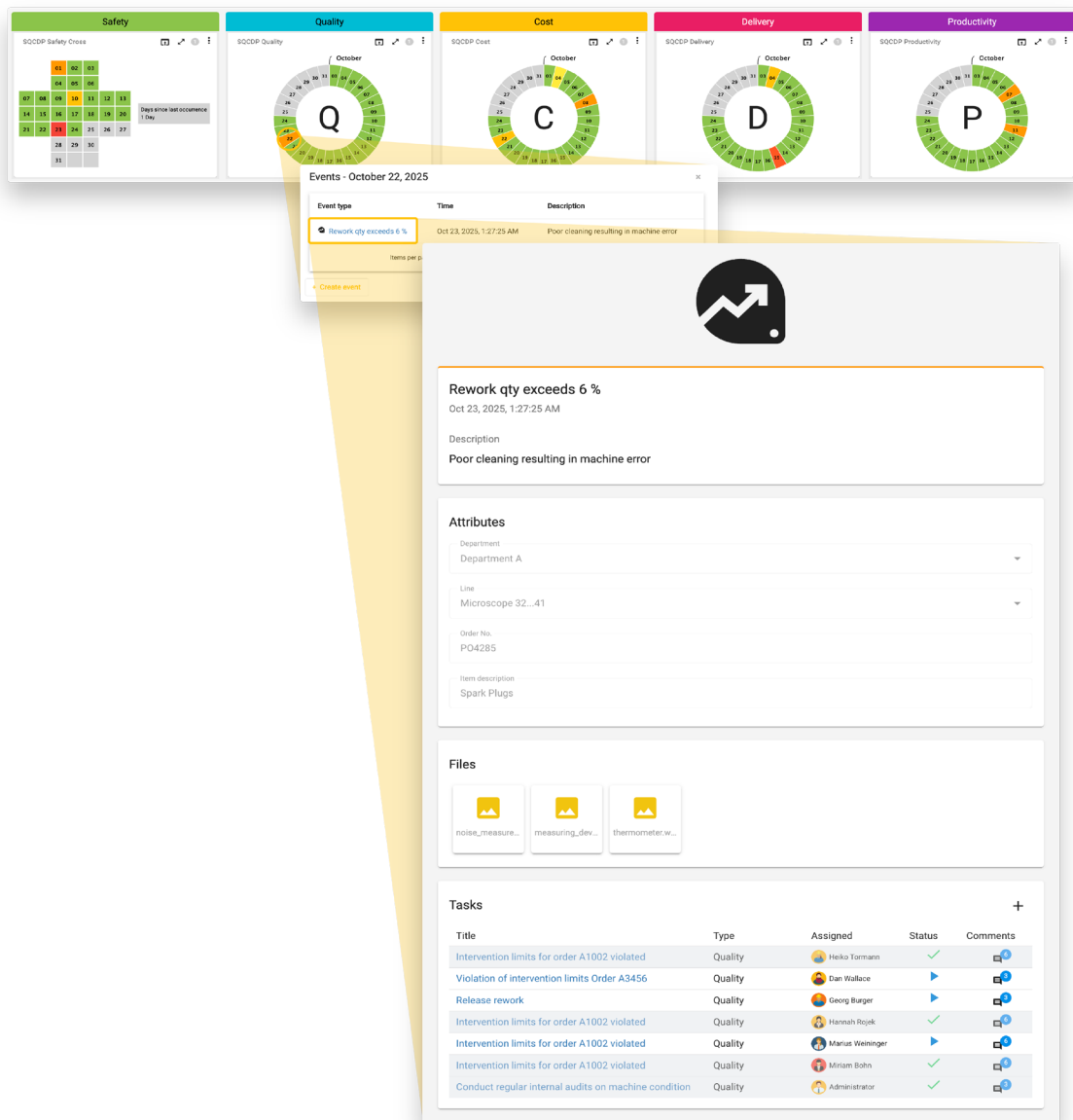
Fig. 7: Monitor events and access details – *Visual Shop Floor*

The capture of events constitutes the first step in event handling. Incidents are documented comprehensively, and follow-up measures are initiated.

Events can originate in three ways:

- **Automatically** through rule-based mechanisms (thresholds or limit violations)
- **Manually** via the Create Event dialog
- **Through interfaces** from connected third-party systems (e.g., CAQ or EHS)

Examples of automatically generated events:

- **Quality:** „Good part ratio < 97 %"
- **Safety:** „Machine pressure > 110 % of nominal operating pressure"
- **Productivity:** „Downtime > 10 minutes without explanation"

IIn the input dialog for manually created events, employees can:

- Select the event type
- Provide a description
- Assign the event precisely using attributes (line, machine, department)
- Attach documents or photos

This creates a consistent and traceable event database.



Fig. 8: Create events manually – *Visual Shop Floor*

## 3. KPI visualization

The visual presentation of KPIs and events is a central component of the digital SQCDP board. Clear and intuitive visualization makes complex relationships understandable, deviations immediately visible, and required actions quickly identifiable.

*Visual Shop Floor* provides a wide range of flexibly configurable widgets that display information from various sources in real time, offering a transparent view of current performance across all levels.

With more than 20 widget types, KPIs can be visualized precisely and tailored to the specific needs. Suitable widgets can be assigned to each focus area, creating a well-structured and easily understandable overview.

Each column can be equipped with different visualization elements – from simple KPI indicators to charts and trend displays, as well as the integration of images or documents. This allows the board to be consistently aligned with the specific informational needs of different user groups and effectively supports data-driven decision-making and continuous improvement.



Fig. 9: Monitor key SQCDP metrics – *Visual Shop Floor*

The column-oriented dashboard initially provides a compact overview of all relevant KPIs and events. For more in-depth analyses, additional detail dashboards are available, which are directly linked to the respective focus areas and can be accessed via drill-down.

The detail pages are flexibly designed and enable targeted analyses, such as:

- **Event evaluation** by line, subprocess, or time period
- **Task tracking** through task widgets with status, responsible persons, and due dates

- **Advanced KPI views** with contextual data, trend series, or cause references
- **Manual addition** of information, comments, or files

This creates a seamless connection between overview and detailed analysis. It enables a deep understanding of performance data, supports root cause analyses, and provides a solid decision-making basis for daily shop floor management.



Fig. 10: Access detailed information via drill-down – *Visual Shop Floor*

## 4. Content control via parameters

To adapt the dashboard flexibly to different use cases, selected content can be dynamically controlled via parameters. Typical settings include department, line, shift, or time period. Through parameterization, the dashboard automatically switches to the appropriate perspective and displays only the information relevant to the selected context.

For example, when a specific department is selected, all visualizations update accordingly: events, KPIs, and trend charts relate exclusively to the chosen unit. Similarly, product- or area-specific views can be displayed without the need to maintain additional dashboards.

Parameters can be selected directly via filter elements on the board or automatically set using predefined default values (e.g., plant assignment). This functionality ensures that a centrally defined standard is maintained, while each organizational unit simultaneously receives a tailored, consistent, and always up-to-date view of its relevant SQCDP information.
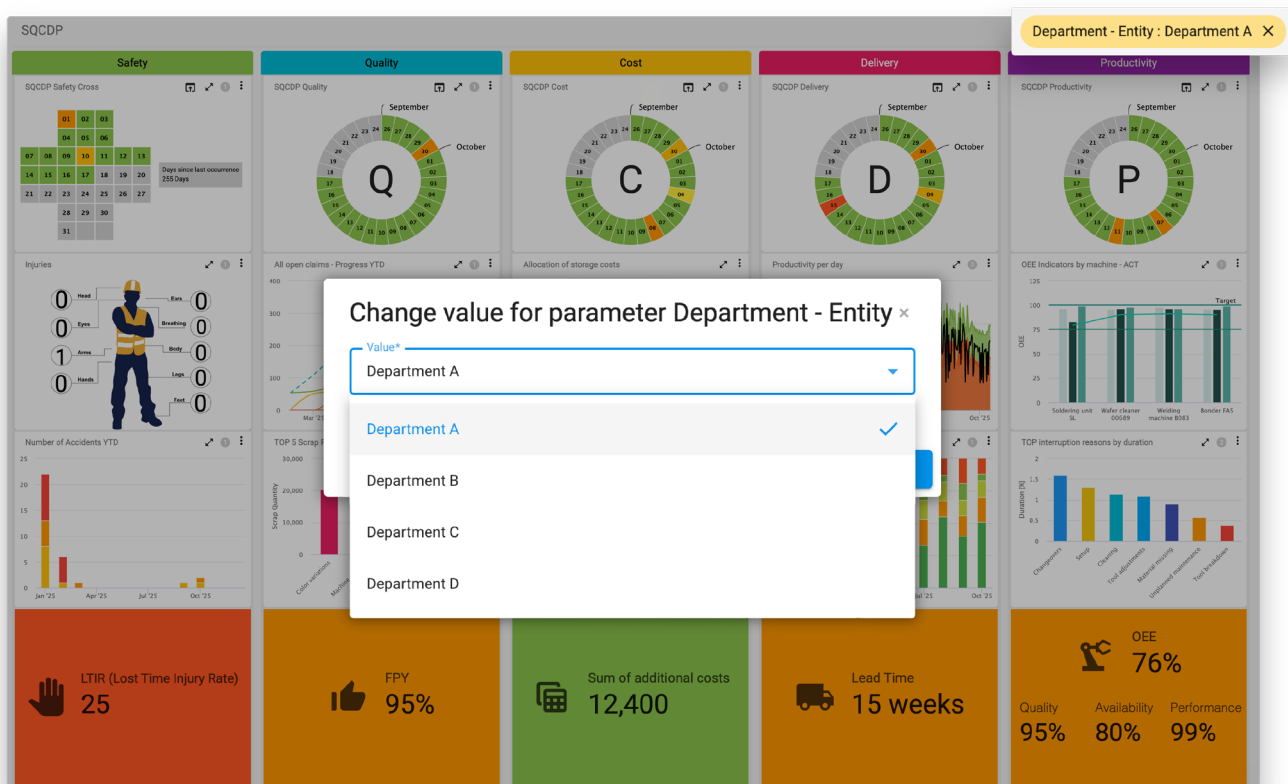


Fig. 11: Manage content via parameters – *Visual Shop Floor*

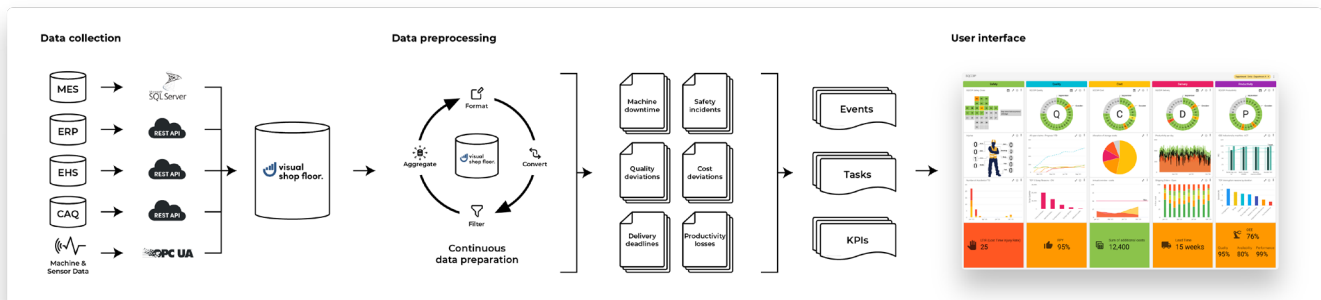# 4.4 System overview – structure and interaction of components

The following overview illustrates the overall structure of the digital SQCDP board and shows how the individual components and functions interact within *Visual Shop Floor*. It provides an example of how an SQCDP board can be implemented using the modular platform and tailored to the specific requirements of a company as well as different production and user groups.

The overall structure essentially comprises the following components:

- **Integration and connection of existing systems**

  ERP, MES, EHS, and CAQ systems were connected via standardized interfaces. This integration forms the foundation for a consistent, complete, and up-to-date data base to represent the focus areas of Safety, Quality, Cost, Delivery, and Productivity.

- **Data preparation and consolidation**

  The captured data is technically cleaned, harmonized, and transformed into a unified, use-case-specific data model. This provides a reliable basis for real-time visualizations, event detection, and operational as well as strategic decision-making processes.

- **User-friendly, use-case-specific interface**

  Based on this data model, a structured and intuitive user interface was developed. It enables central monitoring of all SQCDP focus areas, links them with event and task management, and supports both operational and strategic decisions in shop floor management.

# 5. Results and benefits

The implementation of the digital SQCDP board with *Visual Shop Floor* led to a significant increase in efficiency in daily shop floor management at the company, particularly in the areas of control, collaboration, and transparency. The central, clearly structured presentation of relevant information accelerated information flows, enabled transparent assignment of responsibilities, and made deviations visible at an early stage.

Daily shop floor meetings, in particular, benefited from the clear presentation: meetings became more focused, decisions were made based on consistent data, and measures could be immediately derived and tracked.

An internal evaluation also showed a significant improvement in event capture. Incidents that were previously documented manually or in a distributed manner are now automatically recorded, standardized, and centrally displayed. This increased the completeness of event capture by approximately 60%, and critical situations can be addressed more quickly. Events from the areas of Safety, Quality, Cost, Delivery, and Productivity are now available in real time.

Key benefits at a glance:

✔️ **Increased transparency and traceability**
The digital SQCDP board provides all relevant information in real time. Deviations are highlighted and directly linked to causes, tasks, and responsibilities. This ensures that performance status is always clearly visible – without media breaks or information silos.

✔️ **Structured and efficient meetings**
With the standardized, column-based layout, all teams access the same data foundation. Discussions focus on the key points, coordination efforts are reduced, and meeting duration is noticeably shortened.

✔️ **Reliable task and escalation management**
Clearly defined responsibilities, deadlines, and escalation paths ensure that tasks are consistently tracked and critical issues are addressed promptly.

# 6. Conclusion and outlook

The introduction of the digital SQCDP board established a forward-looking, transparent, and efficient foundation for gradually advancing shop floor management at the company. The existing structure supports both operational decision-making and strategic improvement processes.

*Visual Shop Floor* provides a flexible and scalable architecture for this purpose. Additional use cases, such as digital shift logs, audit processes, problem-solving routines, or area-specific perfor-

mance dashboards, can be seamlessly integrated. New data sources and visualization elements can be incorporated, allowing the system to grow with the company's requirements without compromising overall system stability.

The deployment of the digital SQCDP board thus represents not only a technological modernization but also a significant step toward a data-driven, resilient, and learning production system.

# About us – Solunio

Solunio Ltd, founded in 2013 and based in Brunico, South Tyrol, bundled extensive experience from software development and industry into the *Visual Shop Floor* software in 2015. The comprehensive and end-to-end platform for shop fl oor management offers flexible tools in the key areas fo data management, KPIs and transparency, collaboration on the shop floor and continuous improvement.

Thanks to *Visual Shop Floor*, companies unlock the potential of digitalization in shop fl oor management and improve effi ciency across production and logistics processes. *Visual Shop Floor* is used daily by well-known top industrial companies at a total of 90 locations world-wide. These include globally active groups in various sectors of industry such as Alupress, Intercable, GKN Powder Metallurgy, TDK-Electronics and Plansee.

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❝ *With our software platform Visual Shop Floor, we're redefining the future of shop floor management – empowering industrial production with digital innovations for more efficiency, transparency, and collaboration."*

Matthias Unterberger & Paul Leiter
Founders of Solunio