Supplier Problem Management & Lessons Learned

SQPS-063

Distribution to:		
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1 *Introduction*

Veoneer is a global supplier to the world's automotive vehicle industry. The problems that occur, internally and externally must be solved in a proper way to find the true root cause(s) and to take the necessary corrective, preventive actions and lessons learned at all concerned facilities within Veoneer.

Problem visibility and acceptance are fundamental first steps in the continuous improvement of our company. Supporting a culture and mindset that exposes problems, identifies root cause, and permanently corrects problems, is of critical importance in all areas of Veoneer. Properly solved problems result in permanent solutions, reduced waste, and improved customer relations.

A complete problem management solution is presented in this standard that incorporates common formats for:

- 8D Problem Solving Methods (Section 2)
- Quality Alerts (Section 2)
- Containment (Section 2)
- Yokoten, Lessons Learned Methods (Section 3)

1.1 Purpose

The purpose of this standard is to describe the following:

- When to initiate the 8D Problem Solving Process
- The steps and expectations of the 8D Process
- Problem solving tools and deliverables
- The interface to other Veoneer processes
- When to initiate a Quality Alert
- How to initiate & document Yokoten & Lessons Learned Actions
- Continual Improvement templates (i.e. track metrics from actions taken)

1.2 Responsibility

The **Quality Manager** in each supplier site and Veoneer site is responsible that this Standard is applied.

In cases where problems are identified during Tollgate Phases 0–4 the decision to initiate the 8D process can be made by project manager, engineering management, or the tollgate review board. The project manager is responsible for driving the 8D to closure as the champion.

The **Functional Group Manager** (Business Units, Logistics, Human Resources, Finance, Testing, Technical Support, Maintenance, etc.), with the support of the Quality Manager, is responsible to utilize the 8D process in situations where it is determined appropriate.

1.3 Definitions

Customer issue is defined as any issue involving products that have been shipped, or are assigned to be shipped, or pass through parts assigned to be shipped, to the customer. The

issue may have been identified by the customer or by the Veoneer plant manufacturing the product. This includes issues discovered in the field by Veoneer representatives.

Customer shall refer to any Veoneer plant or facility receiving product. "Customer," as appearing in the rest of this standard, unless noted otherwise, shall refer to anyone having an interest or "stake" (stakeholder) in the problem and outcome. This can include the next step in any process producing products, machines, information, or services.

1.4 Scope

The standard is intended for use in a wide range of situations including problems, encountered in safety, engineering, design/development, prototyping, testing, production, logistics, health & safety/ environmental, as well as any other function.

This standard must be applied as a minimum in the following situations:

1. Customer issues.
2. Supplier non-conforming products.
3. Any Critical or significant (CC/SC) characteristic deviations taken, and/or including the following:
    a. Products that are in development (including prototypes) and are assigned to be shipped, or have already been shipped, to the customer.
    b. Products that are in serial production and are assigned to be shipped, or have already been shipped, to the customer.
    c. Products that have received interim or conditional PPAP approval from the customer.
4. Product/Process development and application launch issues relating to the above, including DV/PV failures and/or any annual OEM specified test failures.
5. At the discretion of the site Quality Manager, additional conditions/ events may drive the need for 8D: dropped skids, line stoppages where safety issues are noted, failures noted during SQPS-412 Interim Inspections, findings from customer visits.
6. For internal/external audit findings (e.g. IATF16949, ISO14001, engineering quality audits, and/or any other audit finding), the tools /methods (e.g. 5why) provided in this standard should be evaluated for use, as appropriate (i.e. based on type and scale of finding).

2 *8D Methodology*

The main problem-solving tool used in Veoneer is 8D (Eight Disciplines of Problem Solving) Method. This standard focuses on the expectations of Veoneer's primary problem-solving method, the 8D Methodology.

Industry standards such as VDA Volume 4 8D Method and AIAG CQI 20 Effective Problem Solving Method provide additional clarifications/ guidance on 8D methodology.

2.1 Initial Problem Response

Problem situations involving, or potentially involving, the customer, may require initial action to isolate the customer and Veoneer from additional risk. In cases of suspected supplier issues, the initial response may include notifying the supplier via NCM (**N**on-**C**onforming **M**aterial) system.

An initial response is intended to protect the customer and Veoneer by limiting any potential risk until the problem is better understood.

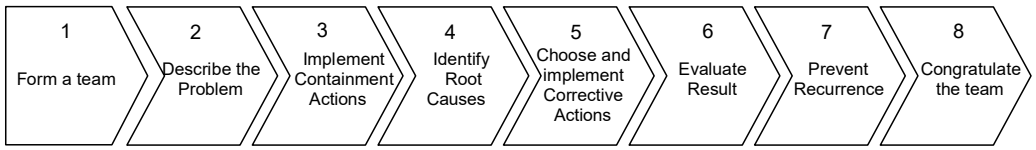
Initial responses most commonly take the form of:

- stop shipments and/or notification to transit warehouses and/or cross docks to hold material
- issuing quality alerts to notify Veoneer facilities of potential issue
    - Notifications to Veoneer facility quality manager, lead buyer and commodity supplier quality engineer
- identifying affected lots (traceability analysis)

In order to maximize the effects of an initial action it must occur timely (generally prior to the problem-solving investigation) and should involve, at a minimum, Plant, Quality, and Logistics and/or TCC management. Typically, timely response is 24-48 hours or as defined by customer.

2.2 8D Process

The 8D process is defined in 8 steps.



Veoneer will register claims in the NCM (Non-Conforming Material) Portal. The supplier is required to submit responses back to Veoneer via NCM system/ Partner Portal. All 8Ds and supporting information should be placed in the NCM system/ Partner Portal.

2.2.1 1D: Form a Team

Recruit appropriate team members for the problem-solving effort. The team should have the broadest representation possible, to get the points of view of all those with an interest in the outcome. Team members need process/product knowledge, allocated time, and

authority. The team shall have a designated team leader who is trained in the problem-solving process and 8D champion/ main stakeholder.

Team members should be considered from the following general areas:

- Supplier
- Internal/External Specialists
- Customer

Appropriate functional representation, within the above areas, shall be considered both in the beginning as well as throughout the 8D process.

Initial team planning should define the following:

- Team member involvement based on the 8D process (who is needed when)
- Standard team follow-up (reporting) times and locations
- Defined methods for exchanging and sharing information within the team

2.2.2 2D: Describe the Problem

The purpose of this step is to completely understand the problem in specific, concise, quantifiable terms (who, what, where, when, and how many).

Describing the problem shall begin by understanding and documenting the following:

- *Customer's (stakeholder) perspective* of the problem (often a symptom)
- *Technical perspective* of the problem at the customer level (quantified)
- *Should be* (desired) and *actual* conditions of the problem (preferably using visualization, drawings, graphs, sketches, and/or photos)

2.2.3 3D: Implement Containment Actions

The team should define, verify, and implement interim containment action(s) to isolate the effects of the problem from any internal/external customer until permanent corrective actions are implemented.

2.2.3.1 Containment actions shall be:

a) ***Initiated*** *quickly* to minimize effects on internal and external customers
b) ***Verified*** *by responsible management as defined in local standards.*
c) ***Supported*** *with appropriate instructions (sorting/rework) and training records. All Sorting/ Rework containment activities should be documented information, preferably in standardized work instructions (SWI) to train operators/ associates. Appropriate change records should be kept for all concessions made, including customer approvals where needed.*
d) ***Validated*** to ensure the actions are effective (validate that the actions do what they are supposed to do, for example Audit, Measurement System Analysis, Gage Repeatability and Reproducibility, Kappa Test.)
e) ***Evaluated*** for risk using Failure Modes and Effects Analysis (FMEA) or other risk analysis tools to prevent secondary problems that could result from the containment action.

2.2.3.2 QPD063 Containment Template

SQPS-063 Appendix A: Containment Guideline defines containment actions involving the inspection of physical parts. **Part containment must involve a review (go and see) of**

locations where parts may be physically located. *The containment guideline* should be completed to ensure all material is accounted for. Forms/ Formats may vary for the checklist, but the minimum information for each containment is identified in this template.

2.2.3.3 Quality Alert

A Quality Alert notifying other lines/sites within supplier locations should be done to verify and/or check the read across to similar processes, products and machines.

Read Across to Similar Processes, Products, and Machines

Containment may not be limited to the original scope or location where the problem occurred. The same or similar problem can occur in other process, products or machines. In these cases, we must understand the containment scope and associated risks. Read across consists of the following:

1. Identify other risk areas (locations or products) within your sites, lines, etc.
2. Evaluate the immediate risk of problem occurrence and/or non-detection
3. Implement immediate containment activity per risk evaluation

The purpose of the read across activity is to ensure the problem will not occur or the outflow of the problem is controlled within your site.

2.2.4 4D: Technical Root Cause Analysis

The purpose of root cause analysis is to determine the technical reasons for the problem occurring and not being detected.

Technical Root Causes directly relate to the technical aspects of the problem occurring and not being detected. The technical cause(s) may include physical dimensions, or chemical, electrical, mechanical, software, algorithm, or optical properties, etc.

Technical root cause(s) should be understood completely, prior to addressing the underlying systemic cause(s) as explained in Section 2.2.7 Prevent Recurrence of this standard.

Technical root cause analysis starts with the ***problem statement*** and must result in defining an identifiable cause(s) for the following:

- Why the problem ***occurred***
- Why the problem ***was not detected***

2.2.5 5D: Choose and Implement Corrective Actions

Corrective actions are implemented to eliminate or control the technical root causes of why the problem occurred, and why the problem was not detected.

Choosing and implementing corrective actions includes the following:

- Selection
- Implementation
- Verification
- Control

2.2.5.1 Corrective Action Selection

Corrective action selection shall result in the following:
Minimum one corrective action selected for every verified root cause

- All corrective actions evaluated for risk (using FMEA or other risk analysis method)

Corrective action selection should consider the following:

- Action's effectiveness, reliability, cost, complexity, and speed
- Optimal solution (not necessarily the first idea)
- Avoidance of design change (if possible, wait for implementation on next SW/HW/part release)

2.2.5.2 Corrective Action Implementation

- Action registers shall be used to document and track, at a minimum, the action, responsible person, and target completion date.
- Corrective actions for problem occurrence should be implemented first, followed by non-detection corrective actions.
- Corrective actions for verified root causes should be implemented first.

2.2.5.3 Corrective Action Verification

Verifying corrective actions confirms the effectiveness of the action to eliminate or control the technical root cause(s).

All corrective actions shall be verified. Verification shall include, at a minimum, an analysis of the following:

- Physical product and process (go and see)
- Applicable data (using statistical tools, for example t-test, graphs, etc.)
- Potential factors that may affect the corrective action (for example models, shifts, operators, etc.)
- PFMEA Go, See & Fix event shall be considered as part of closing corrective actions (Refer to VS104).

2.2.5.4 Corrective Action Control

Controls shall be implemented to ensure technical corrective actions are working and remain working in the future. For example; in the case where a sensor was added as a corrective action there must also be some control installed to ensure the sensor is functioning properly, both now and in the future.

Controls may include, but are not limited to, the creation or modification of the following:

- Check Lists (pre-build, equipment, maintenance, daily, shift, etc.)
- Work instructions
- Statistical Process Control (SPC)
- Sampling
- Gauging
- Audits
- Preventive maintenance

Corrective action implementation is followed by a time period where the long-term results of the actions, and their effect on the original problem, are evaluated.

2.2.6 6D: Evaluate Results

Evaluation must consider the following:

- Effect of the problem from the customer's perspective (consulting with the customer as needed or as required) – Does the customer agree that the problem is corrected?
- Creating situations (actual or potential) that ensure the problem will not recur – Have we challenged the corrective action to check for robustness?
- Collection and statistical analysis of long-term data (enough evaluation time and/or sample size that allow all potential factors to vary) – Do we have enough evidence to judge the corrective actions as effective and complete?
- Confirmation that the implemented actions have had no negative effects – Are we causing another problem with our corrective action?

Evaluation should result in one of the following conclusions:

- **Satisfactory**:
  If the evaluation results are satisfactory then the interim containment activity may be removed, and the effects of the corrective action are considered acceptable.

- **Unsatisfactory**:
  If the evaluation results are unsatisfactory (for example the problem is still present) then the technical root cause must be re-evaluated, and interim containment activity must remain in-place.

- **Inconclusive**:
  If the evaluation results are inconclusive the team must return to one or more of the previous problem-solving steps and re-evaluate.

2.2.7 7D: Prevent Recurrence

The Prevent Recurrence step focuses on the identification and correction of ***systemic root causes*** and the capture and application of ***lessons learned***.

Both parts of prevent recurrence aim to eliminate the problem from repeating, by identifying and standardizing performance improvements in our business processes and standards. Accordingly, improvements are sustained over time and throughout the organization, both now and in the future.

2.2.7.1 Systemic Root Cause Analysis (Drill Deep Analysis)

Systemic analysis focuses beyond the technical root cause to the business processes (development, production, quality etc.) and answers the following questions:

- Why did the business process not prevent the problem?
- Why did the business process not protect the customer (or next operation)?
- Why did the planning of the business process not predict the problem?

Within Veoneer, these three questions are referred to as a Drill Deep Analysis.
The Drill Deep Analysis shall:

- Be management's responsibility
- Involve applicable business process leaders (cross functional as needed)

- Improve the appropriate business processes.

Additionally, the prevent recurrence step ensures we capture and apply the knowledge from the problem-solving process - ***lessons learned*** defined under Section 3 of this standard.

2.2.8 8D: Congratulate the Team and close the 8D

The purpose of this step is to acknowledge results, recognize success, and share key learning points from the problem-solving team experience.

Congratulating the team provides opportunity to reinforce both leadership behaviors, as well as those of the work team. It also provides a forum for promoting best practice used during the problem-solving process.

When congratulating the team consider the following points:

- Be appropriate for the results and effort demonstrated
- Be consistent within the team and respect local practice
- Be timely

Methods used to congratulate the team may include the following:

- Closing team meeting
- Management reviews
- Individual letters/News letters
- Special awards
- Congratulating members during work area or facility meetings

2.2.8.1 Closure of 8D in NCM database

Before closing the 8D it should be reviewed by minimum Veoneer SQE, supplier 8D owner/ 8D leader or in complex cases the entire 8D team.

Note: Supplier 8D Closure
For Supplier 8Ds, the Plant SQs are authorized to close the 8D in NCM database if agreed by the customer interface for the issue (Quality Manager, CQE or Warranty Engineer). The Project SQs and Commodity SQs may assist plant SQs but they are not authorized to close the 8Ds for PPAP'd components.

3 *Yokoten & Lessons Learned*

3.1 Introduction

People in all facilities and in all functions generate valuable know-how, best practices and lessons, originated from reactive and proactive experiences encountered during daily operations. This know-how, or knowledge is ***created,*** must be ***captured*** and ***applied*** to applicable products, processes, methods, machines and systems in our company to:

a) Ensure that the problem is never repeated ever again
and / or

b) Ensure that the value of the knowledge can be multiplied by applying a best practice in other similar areas

3.2 Definitions

Yokoten is a mindset that relies on the following VES and/or industry lean manufacturing best practices:

- **Sharing of Information** (with your peers or within a network of people that could /shall take benefit of this information)
- **Seeking for Information** (best practice/lessons learned from other areas like suppliers, internal….)
- **Evaluating & Applying** Lessons Learned

3.3 Lessons Learned Definition

Lessons Learned is a subset of Yokoten. When knowledge has turned/transformed into an action where the result or outcome of the action has provided a value to us, we have learned a lesson.

3.4 When to practice Yokoten and Lessons Learned

Yokoten and Lessons Learned is ***mandatory*** to practice for the following areas/issues:

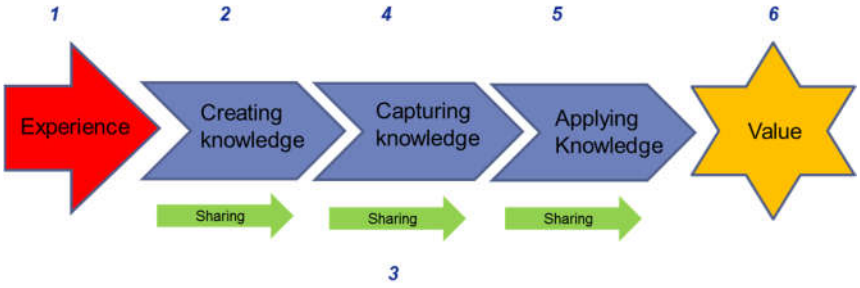
- Any critical NCM
- Design Guideline Review in VPDS Phase 0, 1, 2.
- Design Review in VPDS Phase 1, 2, 3.

Yokoten and Lessons Learned is ***optional but recommended*** to practice for the following areas/issues (but not limited to):

- Audit findings, E.g. Zero defect workshop findings, PFMEA GSF Priority 1 findings, etc.
- 8Ds
- Best practice results
- Round table discussions
- Risk Analysis discussions

3.5 The Yokoten and Lessons Learned Process

To transform a valuable experience to a value, the following process is a guide:



3.6 STEP 1. Input: Experience

Every day, each of us gains experience. Sometimes experiences result from something that happens – a real problem or event that occurs. These are "**Reactive Experiences**." Example: Cat As & Critical NCEs.

As well, there are experiences that we can anticipate, often as a result of being curious and engaging in proactive methods such as design reviews, audits, and risk evaluations. These are "**Proactive Experiences**." Example: Information shared in a Design Review.

Additionally, there are experiences that result from our efforts to make things better, a new way of doing something or a good idea. These are referred to as "**Continual Improvement Experiences**" and often are the result of a workshop or PDCA cycle. Example: Information from a Kaizen workshop

3.7 STEP 2. Creating Knowledge

As each of us begins to reflect on our experiences more deeply and with our teams (which normally begins immediately following an experience) we begin to synthesize the experience and cognitively transform the experience into new knowledge.

The knowledge we gain from our experiences has the possibility to be formalized and expressed in the form of a lesson. Lessons are a formal, documented, expression of the knowledge we have gained.

3.8 STEP 3. Sharing

Following an experience, we can share our experience with others, however, sometimes sharing the experience alone will not be enough to ensure understanding at this early stage.

When we can describe and express the knowledge gained from our experience we can share again – sharing is good, as the new knowledge can spread to others who can take advantage of the information.

3.9 STEP 4. Capturing Knowledge

As the lessons, built from the knowledge of our experiences, are formalized we must ensure they are captured in appropriate master documentation and standards. In this way we preserve and respect the knowledge gained and can systematically spread and apply the lessons as our natural way of working.

Examples of global master documents

- Design Guidelines
- Machine Specifications
- Design FMEA (specific and master)
- Process FMEA (specific and master)
- Product and Equipment Drawings and Standards (specific and master)
- Part Drawings
- Master Drawings
- Control Plan
- CC/SC Lists
- Standard Work Instructions
- Training Guides
- Corporate Standards

In instances where we may have continual improvement lessons, we seek to share these through benchmarking and best practice forums. If the decision is taken that a particular "Best Practice" should be standardized, then our standards and master documentation would be updated to reflect the best practice.

To ensure that lessons learned are preserved in a structured manner, any global master document shall

- Have a clear ownership and a clear approval authority
- Have an explanation/standard for how it is updated
- Have a standard method for how changes are communicated
- Be accessible to all who need to apply the master document
- Have its modifications/revisions tracked and notes as a lesson learned

3.10 STEP 5. Applying Knowledge

A challenging aspect is applying the lesson to our current and future machines, parts/designs, and work methods. Doing so effectively brings the greatest value to the organization.

When we have captured the lessons and applied them, we can say we have "Lessons Learned"

3.11 STEP 6. Output: Value

If the Yokoten and Lessons Learned (LL) Mindset is understood and applied, the value is more robust products and processes, less cost, increased customer satisfaction and a learning organization that turns even more experience into value.

4 *Appendices*

4.1 SQPS-063 Appendix A: Containment Guideline
4.2 SQPS-063 Appendix B: 8D Template

5 *References*

5.1 SQPS-412 Interim Inspection Plan (IIP)
5.2 VS052 Veoneer Standard Special Characteristics Classification
5.3 VS104 Veoneer Standard FMEA
5.4 VDA Volume 4 8D Method
5.5 AIAG CQI 20 Effective Problem Solving Method

6 *Modification Index*

Version #	Date/Author	Modification
1.0	24-MAR-2020/Kavitha Shah	Converted VS063 into SQPS for external supplier use only.