

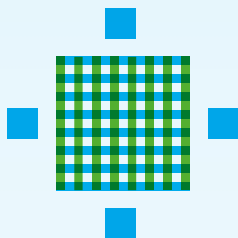
Strengthening  
earnings  
power



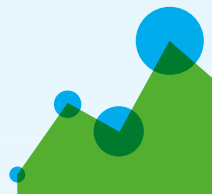
Medium-term goal

## Improve operational efficiency

Priority themes



High quality  
products



Increase added  
value of processes

Relevant SDGs



12 Responsible  
consumption and  
production

SUSTAINABLE  
DEVELOPMENT GOALS

## High quality products

### Quality control system

To provide consistent, high quality products, TEL has been acquiring ISO 9001 quality management system certification at various sites since 1997 in line with its policy of making quality a top priority. Nine manufacturing sites have achieved this certification to date. In 2016, we established a uniform Group-wide Quality Policy and since then each Group company has pursued the goal of achieving the world's best quality. In 2017, we will continue to work together as one to drive quality improvements.

### Quality education

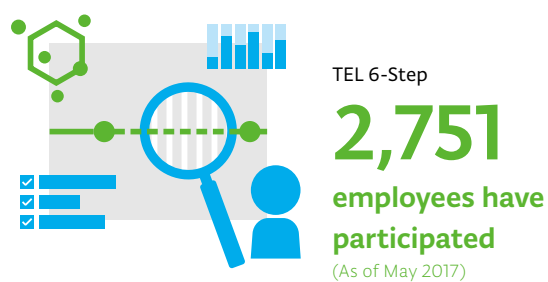
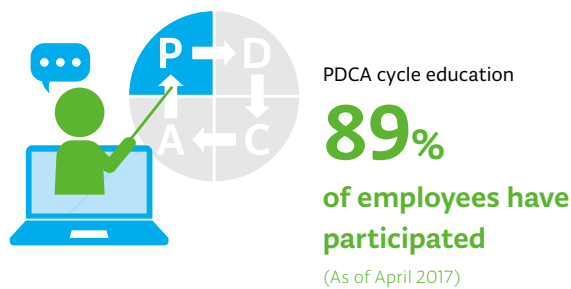
TEL believes that every employee needs to have a high awareness and understanding of quality. This is why we conduct a range of education programs including the fundamental quality education that all new employees receive.

For example, to enable employees to improve their knowledge and skills in the area of quality control, and to improve the quality of their work, we encourage them to obtain external quality certification through the QM/QC Exam (Quality Management and Quality Control Examination). Administered by the Japanese Standards Association and the Union of Japanese Scientists and Engineers, the QM/QC Exam is a major quality certification with more than 440,000 certification holders in Japan as of March 2017. Since fiscal 2012, this initiative has increased the number of certified employees each year to a total of 1,579 as of March 2017.

We also educate our employees around the world about the Plan, Do, Check, Act (PDCA) cycle. Through e-learning courses, employees learn efficient process management using the iterative four steps of the PDCA cycle. As of April 2017, 89% of our employees had completed the courses.

In addition, we have an education program called TEL 6-Step, a problem-solving model for serious problems aimed at employees in production and service divisions. This is a customized version of the eight discipline (8D) problem-solving method\* widely used in quality control. The TEL 6-step program enables systematic and reliable analysis of problems to determine the root cause, leading to quick implementation of countermeasures and prevention of similar problems. We currently use web-based training for delivery, and as of May 2017, 2,751 employees had completed the program.

\* 8D problem solving method: A method for solving problems in quality improvement through eight disciplines or processes



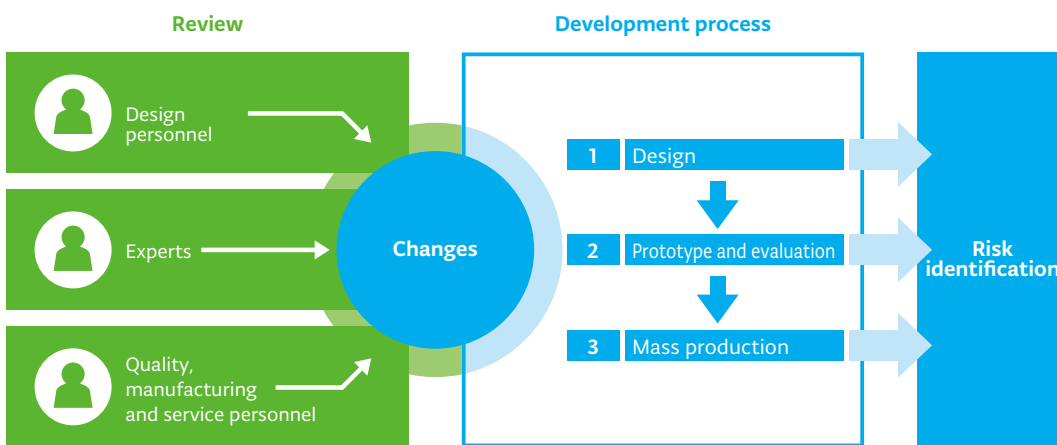
# Strengthening earnings power

## Pursuing quality at the source –GD<sup>3</sup> design review–

TEL has adopted a front-loading approach to improve product quality. Specifically, we use the GD<sup>3</sup> (GD cubed) management method of problem prevention to ensure thorough risk identification from the concept design stage. Using this method, the designer and reviewer review each stage from design and evaluation to full production and identify risks, focusing on changes from the previous designs.

When using the GD<sup>3</sup> method, we adjust techniques and work environments to improve our ability to identify risks. To achieve a high quality review, we need high quality reviewers, so we request the participation of internal experts in the review process. At the same time, our basic rule is to assign additional people from each division to identify risks from many different angles. To improve the efficiency of discussions, we have created search tools to find past instances of problems and we use mind mapping to be more imaginative in risk identification.

Not only do we ensure full implementation of the GD<sup>3</sup> review process internally, we also recommend the method to suppliers to help further enhance quality in the upstream processes.



## Safe equipment design

TEL carries out product risk assessments as early as possible in the development phase, taking the entire product life cycle into consideration. Based on the results of these assessments, we implement intrinsically safe equipment design<sup>1</sup> to reduce the risks posed to humans. We also examine and ensure compliance with increasingly challenging laws and regulations around the globe and create systems for abiding by all safety regulations of the regions where our equipment is shipped.

Equipment shipped from our factories is checked by a third-party inspection organization to ensure it complies with SEMI S2<sup>2</sup> international safety standards. For equipment requiring CE marking,<sup>3</sup> we acquire a Certificate of Conformity (CoC) issued by Notified Body (NB) stating conformity with the Machinery Directive and EMC Directive.<sup>4</sup>

1 Safe equipment design: Innovative machinery designs that eliminate causes of machinery-related hazards posed to humans

2 SEMI S2: The *Environmental, Health, and Safety Guideline for Semiconductor Manufacturing Equipment* is a set of guidelines for safe design of equipment. It is used mainly by the leading manufacturers of semiconductor equipment in the United States and Europe, not only for ICs but also as safe procurement guidelines for electric and electronic device manufacturing equipment around the world.

3 CE marking: When exporting into the European Union, CE marking defines rules for displaying a CE mark as proof that the equipment is safe and complies with EU-defined rules (Directives)

4 EMC Directive: One of the New Approach Directives that apply to the 27 EU member states. This directive applies to all electric or electronic devices that are at risk of being disturbed by electromagnetic interference or that may interfere with other equipment. The current directive is 2014/30/EU.

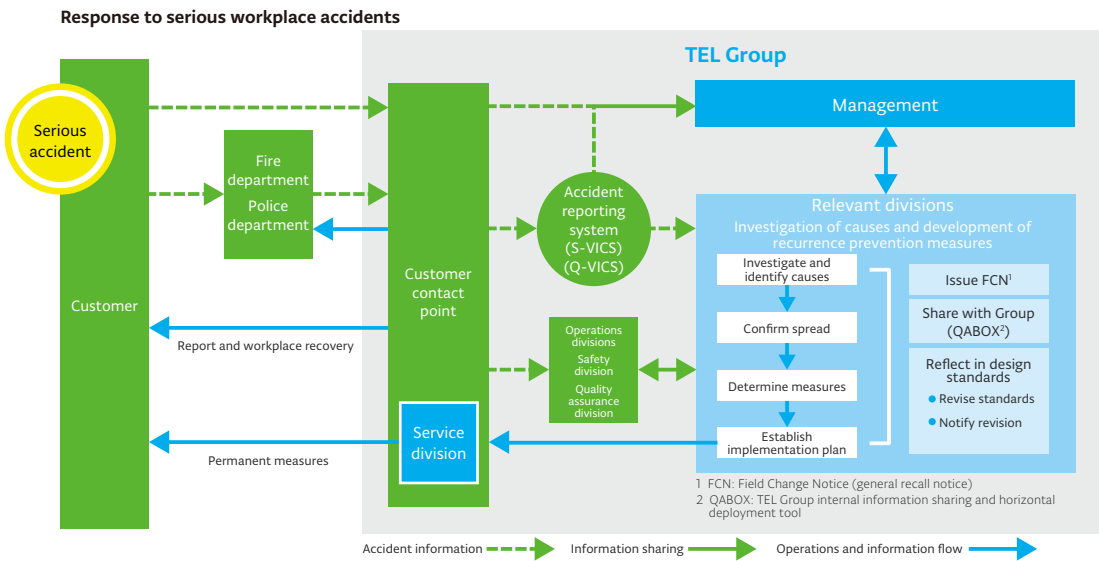
## Quality improvement cost reductions

As a key issue for enhancing earnings power, TEL implements initiatives to reduce costs associated with quality improvements that are required after equipment is shipped. Each year, we select five types of defects to prioritize for elimination, focusing on those that either result in a significant cost or occur frequently. We identify the causes of the defects, whether in the design, handling, or another area, and adjust our products based on our findings.

## Response to quality problems

TEL complies with ISO and EN safety standards, as well as establishing design rules applicable to its own equipment to achieve the highest level of safety possible.

In addition to developing systems to manufacture safe products, we fulfill our mission as an equipment manufacturer by developing systems for responding to design- or manufacturing-related issues or accidents arising from operation-related problems. If an accident occurs, we use our S-VICS accident reporting system to report and share information with all levels of management, from safety and quality personnel in each division all the way to senior management. We immediately conduct an accident investigation to identify the cause and plan preventive measures. In addition to implementing the measures on the problem equipment, we use a proprietary system called QABOX to quickly implement the measures on equipment operated by other customers and reflect those measures in design standards in operation.



## Initiatives with suppliers

Developing strong partnerships with suppliers is essential to improve product quality. Since 2000, TEL has regularly conducted Supplier Total Quality Assessments (STQA) to clarify what is expected of suppliers in terms of maintaining and improving quality.

Before starting business with new suppliers, an STQA is conducted via self-assessment to evaluate their product quality, costs, and information security. The assessment also includes CSR issues, including human rights, ethics, safety, and the environment. If any risks to quality are found, our trained and certified auditors visit the supplier on-site to explain the problems, our expectations for improvement, and the level of quality we require. After the supplier understands the issues, we ask that they plan and implement improvement measures in line with our written requests. We keep track of all requests and improvement measures internally, and offer continual support to suppliers until all necessary improvements have been made. We conduct on-site audits once every three years at suppliers who manufacture important components and at suppliers where quality issues have been found.

We focus on change control with our suppliers. We aim to reduce the number of quality issues that occur as a result of changes to the design or manufacturing of equipment components and modules. We also aim to reduce the cost of quality improvements. We use change control briefings to inform suppliers of the requirement to submit a request when changes are made. We have been conducting web-based training since 2015 to get more suppliers to understand the importance of change control in respect to quality and to ensure they submit the required change requests. Approximately 900 people participated in this training during fiscal 2017.

## SQIP defect prevention activities

TEL works with suppliers to implement the Supplier Quality Improvement Program (SQIP), a series of activities designed to prevent defective components. The SQIP aims to visualize the root causes of problems (defect factors) and encourage independent defect prevention activities by asking each of our suppliers to explore defects that have occurred in the past. Through this process, the program aims to reduce the number of defects by half.

Our suppliers use the self-assessment of their quality control systems to analyze closely the source of previous problems in their manufacturing environments, whether in ordering, design, production, inspection, or training. This helps them to identify weak points and make improvements to systems or work methods.

## QC Patrol

Component module manufacturing processes have a strict requirement for accuracy. Processes like crimping work, soldering work, and terminal block connecting work have a significant impact on the safety and service life of our equipment, yet, from the outside, it is not immediately obvious whether they have been done correctly. We treat such processes as important tasks. In our suppliers' production facilities, our systems ensure that these tasks are performed by skilled employees who have passed tests conducted by TEL-accredited trainers. Our quality and manufacturing division personnel also visit our suppliers as part of our QC Patrol activities to check on the quality of their work. In addition to this, our technology and quality personnel join forces in a separate QC Patrol activity to inspect channel welding work and inspect for leaks and cleanliness of gas components.

## Increase added value of processes

### Company-wide business process re-engineering

As one of the key issues in the medium-term management plan, TEL is working to increase profits by improving the efficiency of its operations. To achieve this aim, each business unit and overseas subsidiary is re-engineering its business processes. They are working to acquire the necessary data and information for management decisions and business operations more quickly and accurately by optimizing business processes, creating standards where necessary, and optimizing those processes across the whole company.

We have gathered experts from across our production, sales, logistics, services, accounting, and business management divisions around the world. Together, we are currently conducting a multi-faceted review of our business processes, including vertical processes within each division, horizontal processes across different divisions and functions, and customer-related processes such as ordering, production, shipping, and acceptance. We plan to incorporate the results of this review into new core IT systems, and we will start a phased rollout with a view to full utilization by 2019. By creating a business platform from new core systems that take into account the entire value chain, including other divisions and customers, and at the same time eliminating waste, we aim to become a company that can drive efficient businesses based on highly-accurate business predictions, while making strategic use of our human resources, material, capital, and information.

### Quality and productivity improvement through TPM

TEL has been implementing company-wide Total Productive Maintenance (TPM) for over 10 years. The purpose of TPM is to eliminate inefficiencies, waste, and loss, and thereby improve productivity. At the same time, it aims to change employees thinking and behavior. The TPM approach plays a role in employee development and has been successfully integrated into our production lines. Promoted in cooperation with design and administration divisions, the synergistic effects improve both quality and productivity. TPM is also being used to improve business process quality between indirect divisions. TPM activities that have produced outstanding results are shared company-wide at the annual TPM presentation, with a Grand Prize and other awards to help motivate employees in their activities. From fiscal 2016, participants included not only teams from Japanese manufacturing sites, but from our overseas site Tokyo Electron (Kunshan) Limited (established in 2012) as well.



TPM presentation