Aiming for Integrated *Monotsukuri* Engineering

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In 2008, I wrote the article titled “The Viewpoint of Rules and Principles” in the previous issue of this Calsonic Kansei Technical Review. This time, I would like to write from a new perspective I have since gained through my own experience of *monotsukuri* (meaning creating things) engineering.

Since the global recession of 2008 after the Lehman collapse, Calsonic Kansei has overcome many challenges including the Great East Japan Earthquake and the Thailand floods, and now in fiscal 2015, we finally have 78 *monotsukuri* bases worldwide. Our efforts have also focused on MTCR (*Monotsukuri* Total Cost Reduction) activities, which aim to thoroughly eliminate waste from the *monotsukuri* process and improve the process on an on-site basis, in order to enhance our competitive edge. Going forward, we will face a next great challenge other than product development issues—what sort of *monotsukuri* should we aim to achieve in handling the increasing number of projects, while making maximum use of the *monotsukuri* bases?
Meanwhile, we also need to consider new efforts to combine the Internet with the *monotsukuri* site, such as Industrial 4.0, and countermeasures against global warming to reduce CO2 emissions.
Thus we must ask ourselves again what a good product is, or what good global *monotsukuri* is, in order to survive in the age of mega-competition as a global automobile parts manufacturer as well as to innovate our *monotsukuri* activities in such severe surroundings.

However, the *monotsukuri* concepts for automobile parts manufacturers have originally been extremely simple. Let me show you the key points below:

1. To innovate products, it is necessary not only to evolve their structures, but more importantly, to innovate their materials and manufacturing methods. Particularly, given Calsonic Kansei’s product line which centers on standard products, product evolution is not viable unless manufacturing methods are evolved.

2. Engineers in charge of design should design product functions while factoring in the cost target given to the product. Don’t cling to the idea that designers need only to do design. Engineers should analyze the costs of their components, always grasp both functions and costs as prices for the functions, and understand what the structure should be to make the machining process easier (which consequently lowers the costs and ensures the quality). From my own experience, mutual communication between our plant, material suppliers, and parts suppliers is vital for these purposes. *Monotsukuri* engineers should learn many things from going and seeing the on-site manufacturing processes of suppliers, not only from those of their own plants. I believe seeing many plant sites and parts manufacturing processes is the starting point of the PDCA cycle for engineers. I myself visit the suppliers’ plants every time I go to our global plants, and there, I can still find new things (about manufacturing methods or materials) and learn some tips for improvement measures.

3. Environmental resistance specifications including those for reliability testing should be defined by ourselves, a professional in automobile parts manufacturing. Complying with specified requirements and passing given reliability tests are not enough. Engineers should first know that specifications can vary greatly depending on vehicle models, use conditions in the market, and regional characteristics, and then, if necessary, should proactively create new specifications by themselves. Especially when they have to create new specifications for products with new use application, they need to forecast quality concerns and look for the weak points of the products from the concept study stage by considering the use conditions in the market using QFD or similar methods.

4. Increasing the type variations of products at the concept stage poses a significant impact from the overall perspective of the *monotsukuri* process, and so designing a new type and part number without reasonable grounds leads to a heavy burden on the subsequent processes. Once a product is launched, the product must be continuously mass produced, and even after EOP (End of Production), the service parts must be supplied for about 10 more years. This means products have an extremely long life cycle until actual production end, and the plant can have a great bottle neck if it has many variations in product type (the worst example is adding types without any common areas) and unique manufacturing methods. Thus engineers need to thoroughly study the application range and the common areas of products.

Finally, the most important point is to first understand what is expected for Calsonic Kansei's *monotsukuri* engineers. As engineers of an automobile parts manufacturer, we are required not merely to have experience and knowledge within limited domains like "design" or "production engineering." Also, we need to understand all the *monotsukuri* processes that build up the products, have on-site experience, and make use of them to take a lead in the *monotsukuri* activities. In short, engineers are required to be a professional of their product. Such experts, called Mr. / Ms. RAD (radiator) and Mr. / Ms. HVAC (Heating, Ventilation, and Air Conditioning system for automobiles) for example, are capable of continuously evolving the product from an integrated perspective and innovating the *monotsukuri* process.

Functional evolution of automobiles and global production expansion are being progressed. In such a time, let us all work on integrated *monotsukuri* engineering based on the "five actuals" principle (*gogen-shugi; gemba* meaning an actual place, *genbutsu* meaning an actual part, *genjitsu* meaning an actual situation, and *genri* and *gensoku* each meaning a principle) on a global scale, aiming to pass down these activities as our legacy—our *monotsukuri* engineering DNA.