BHEL Smart Wall Blowing System: New Product Development in Manufacturing Industry

Case Analysis

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BHEL had been facing lower than expected heat transfer in its boilers that were installed at various customer locations. This low heat transfer affected the quantity and quality of steam that was produced, resulting in loss of efficiency of the plant, leading to significant revenue losses. Investigating the causes led to the identification of coal ash deposits over the wall panels as a key factor. The case describes the steps taken by BHEL to address this issue and the final decisions taken. The case outlines the steps taken in two distinct parts: first, identifying the solution and its implementation, and then, demonstrating the solution to the customers. This case analysis, given that there is no decision to be made, looks at the various steps and related facts presented in the case and critiques the same.

NEED

This is a unique case of product development. Where most product development projects are initiated through market need or market entry motivations, in this case, a rare one, the need for product development arises from a quality problem. Thus, in contrast to the needs of product development coming from the marketing department, in this case, the need arose from the need to address a quality problem, thereby constraining the kind of solutions that could be proposed. In a typical product development programme initiated by marketing, even if a derivative product is being developed, the R&D engineers have a certain amount of freedom to propose solutions. However, in this particular case of ash deposits over wall panels, any solution proposed by the R&D engineers will need to seamlessly integrate into the existing boilers that BHEL has installed at various customer locations. Thus, the degree of freedom available to the R&D engineers, whether in terms of space, heat, signalling, etc., is limited. Therefore, the range of options that they may pursue is also limited.
ORGANIZATION

The first step in any such product development process is the formation of the team, more importantly identifying what kind of team would be needed. This decision will be largely driven by whether the solution being sought is highly dependent on a particular function in the organization or would need participation from multiple stakeholders from across functions. In this case, the solution involved integrating capabilities in sensor development, sensor integration, creation of heat flux profiles, heat transfer analysis, amongst others; thus, spreading across various functions. The need for integration across so many departments would require a strong project manager. While such a manager would need to have sound but not necessarily complete technical knowledge, it is more important for the manager to manage the different functions to deliver the right solution within the time, cost and quality dimensions (from the case while it can be deduced that solving the problem can be considered as the quality objective, there is no mention about time and cost objectives). Often such project managers, in product development, are referred to as lightweight or heavyweight managers (Clark & Wheelwright, 1992). In this case, the person leading such a case needs to be somewhere in between, perhaps a middleweight manager. A lightweight manager may be insufficient as the project involves researching and identifying a solution before proceeding towards development. A heavyweight manager may be overbearing as the project seeks to find a solution rather than create a new product.

DEVELOPMENT PROGRESS

The case mentions that it took five years for product development before they could call different customers to demonstrate their solution. The case is scarce in providing more details on the various stages that the product development efforts went through and the corresponding time needed. In a project like this, it is very difficult to envisage at the start the time required to complete the project. There is a lot of fuzziness in the beginning as the search for a solution begins. This stage needs a set of research engineers across the various functions mentioned who will work together to develop an initial solution. Since this is akin to a search problem, while an overarching time limit may be mentioned, it is necessary to have frequent meetings (daily or weekly) so that a basic integrated solution may be achieved quickly and development initiated. These research engineers may need to do certain prototyping, but, in this case, the first prototype testing can only be done at a customer location. This implies that the research engineers need to provide their solution to the development team who will then take the solution forward towards prototype development and prove out (some research engineers may continue to be a part of the development team). Once the development team is formed, the first step, led by the middleweight manager, would be to develop the detailed project plan in accordance with the stage process (Cooper & Edgett, 2012). This would include prototype development, ordering of new parts, performing process, failure modes and effects analysis (FMEA), and finally prove out at the customer. Significant identified events in the process need to be followed by stage gates that can determine whether the solution can progress further or a new solution should be explored. The importance of FMEA for both the design and process, and the development and successive reduction of risk priority numbers (RPNs), in this case, cannot be undermined since the prove out will be at the customer’s location.

PRODUCT FINALIZATION

In a typical product development process, the development process starts with a design freeze and acceptance of deliverables by all team members. Prototype development and product design adherence and delivery are part of product development, and the final product offered to the customer is one that is proven. However, in this case, the prove out of the prototype is at the customer site on an existing functional product. This would imply that BHEL would possibly need to have a large team at the customer site and assemble, observe, modify as necessary. In such a situation, the failure of the new design can be a significant setback and would delay the project phenomenally.

MOVING FORWARD

The case talks about the success of the SWBS that was installed at KPCL, and the doors that opened thereafter. While one door that opened was the installation of the solution in most of the boilers that BHEL had already installed and functioning at various customer locations. The second door was the incorporation of the solution in all forthcoming boilers to be manufactured. The product development efforts concentrated around the first one, but the team had to be sure that the solution would work in all functioning and forthcoming boilers. They would need to monitor the introduction of the SWBS in a few more installations before actually declaring victory and then work with their manufacturing function towards integrating the SWBS in all future boiler production. However, the real opportunity for BHEL is the third door that opened, that is, customer requests to supply the SWBS as a standalone system for boilers procured from BHEL’s competitors.
This would be a strategic and marketing decision that BHEL would have to make. If BHEL decided to progress in that direction, it would be very important for them to create the right organization structure. Given that it would be a completely different revenue stream and some amount of engineering and integration effort needed for each installation, a minor group lead by a lightweight manager (since it will be more of co-ordination than technical development) will need to be formed to pursue those opportunities.

REFERENCES

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