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QFD Concepts Integrated with Design of Indian Military Vehicles

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ABSTRACT

The design requirement of military vehicles is very specific, unique and of high reliability. The product design is exclusively for particular purpose to suit defense requirement i.e. maneuverability, survivability and combat. The design of the product generated based on customer voice by way of Quality Function Deployment reveals optimum satisfaction of user.

The paper describes how Q.F.D. can be applied as a tool with good potential to ascertain the product design having rare specification of the product to fulfill the requirements of army personnel. QFD presents a prime facie case for being a powerful tool for the transformation of vague, imprecise, customer requirements in the clear measurable technical requirements.

Keywords: Quality Function Deployment Product Design Specification; Remote Controlled Weapons; House of Quality.

1.0 Introduction

On focusing the country's defense scenario, it is observed that the battle zone now has been shifted from conventional to unconventional. Besides the border incursion, there is serious security problem of jungle warfare, terrorism and nexalities.

Moreover to operate vehicle at difficult terrain having extreme climatic conditions is also a challenging issues while finalizing product design specification.

Defense vehicle needs military solutions i.e. Armed personal carrier, troopers, mobile command and control and home land protection. Also to meet world class and robust security system along with environments condition of the battle zone. Maneuverability, survivability, combat and road off efficacy are vital factors uncomprisedly there.

In addition to that interior design includes comfort, protection, fitments of communication equipment, monitoring system, electronic counter measure, manual as well as remote control weapon stations etc. are important element of design.

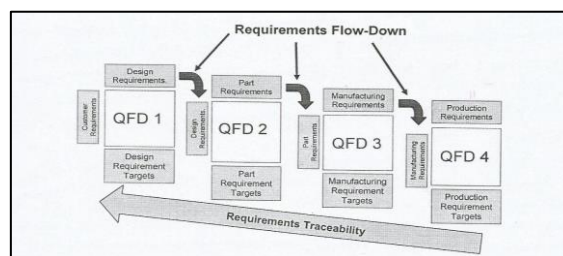
1.2 The customers of army vehicle -

- 1) Indian Military
- 2) Border Security Force (BSF)
- 3) Central Reserve Police Force (CRPF)
- 4) Anti Terrorist Force (ATF)
- 5) Indian Territory Border Police (ITBP)

1.3 Some indian light armored defense vehicles

- 1) Stallion MK S
- 2) LPTA MK 13
- 3) Mine Protecting Vehicle
- 4) Mahindra Rak Shak
- 5) Panther Model TE, 58
- 6) TATA - LSV - Q DMCT

Fig 1: QFD Process



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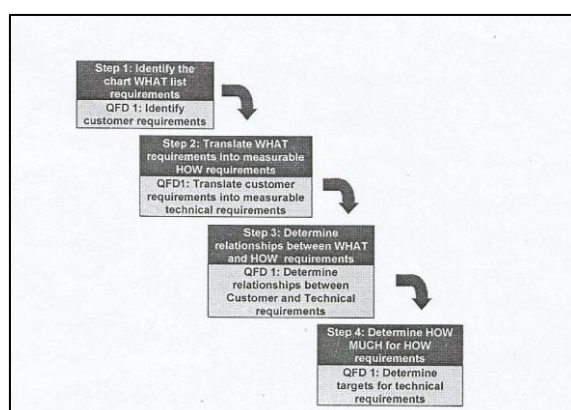
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2.0 Review of QFD Methodology

Q.F.D. is a customer driven tool in implementing total quality management. It helps in translating customer needs into requisite technical specifications of the product at various design level then goes for its development. Q.F.D. aids in translation of vague, impressive customer needs into clear measurable technical specification. This provides a logical and systematic methodology for capturing and groaning the requirements.

QFD deals with data related to customer satisfaction identifying attribute, which should be considered while designing the product. The analysis and classification of customer request effecting the satisfaction of customer. That is a systematic approach which can be mentioned in the following steps –

Fig 2: Step of QFD Method



Step -1

The first step is to capture the basic needs of the customer i.e. "WHAT" is that the customer needs. This exercise requires considerable time to study and scrutinizes the requirements of the customer. Apart from that it is tactful and forceful activities to ascertain the relative importance of the requirements of the customer. The output of this process is the base of decision making while designing the product.

Step - 2

To translate voice of the customer into technical attributes, it is essential to refine the vague, ambiguous needs of the customer prior to transform into measurable technical requirements of the product.

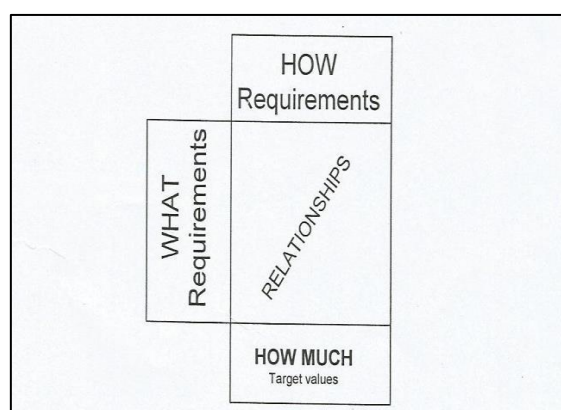
Step - 3

As because customer need i.e. "WHAT'S" and technical requirements (How) are in good number. Therefore establishing appropriate and feasible relationship is one of the most important step of the concepts. "House of Quality" that is well known tool of Q.F.D. to capture relationship matrix is applied. In this process strong, medium and week relationship by mapping customer requirements and technical requirements are carried out.

Step - 4

House of Quality matrix provides conclusion over prioritization of customer requirement and technical requirement relationship. The result thus optimum obtained is basically applied while designing the product to achieve the satisfaction of the customer.

Fig 3: Basic of House of Quality



3.0 Concept Generation

The design of the product is undertaken based on technical specification co-related with customer attributes some optional facilities like foldable structure, first aid facilities and intercom system etc. should also be considered to delight the customer. The upgrading of the product to the tune of next generation level as well as world class version of vehicle are now expected by arms personal for quick, effective response to the attacks. Therefore product study and opinion of the customer should be studied to know the existing realities and fact about the use of the product. The customer identification and interaction with them assists to generate product specification.

4.0 Conclusions

Now the day's army operations are pushing from peace - keeping to irregular warfare, in border incursions, internal threat of terrorist and nexalities attack. Army needs unarmored and multirole all terrarium vehicle, specialized operation against attacks. Quality Function Deployment provides a practical and pragmatic approach that enables to enhance the quality of the product.

References

- [1.] Sturat Burge. A functional approach to Quality Function Deployment System Engg. 2007
- [2.] Akao Y. QFD- Integrating Customer requirement into product design. Combridge, MA: Productivity Press. 1990
- [3.] ISO QFD. Portland Sept. 2010.
- [4.] Clausing D, S Pugh. Enhanced Quality Function Deployment, Design & Producting Int. Honolulu 41. 1991
- [5.] Midhun Eliyas IV. Hime Kiran Vithal. Concept design of Spl. Veh. Indian Military, 13, SAS Tech. Journal. 2014
- [6.] John Pike. Common Remotely Operated Weapon Station, 2013.
- [7.] Defense News. India needs move vehicle but spending less, 2013.