

‘Productivity Improvement through Team Building Approach’

Prof. (Dr) Satish Ubale¹, Sumit Godalkar²

Professor and Director¹, Matrix School of Management Studies

Research Scholar², Neville Wadia Institute of Management Studies & Research, Pune, India

Abstract:

‘Productivity Improvement’ is never ending process and prime target for all types of manufacturing and service industries. Productivity can be increased by reducing ‘Seven types of Wastes’ i.e. transportation, inventory, motion, over processing, over production and quality defects. Managerial quantitative and qualitative techniques are useful and effective tool for reducing non-value added activities and improving value added activities.

‘Team Building’ is one of very effective managerial technique, which increases involvement of all types of management and shop floor associates in organisation ‘Profit Making’ objective. This research paper explains the achievement of ‘Quality Circle’ group by improving low pressure die design. Quality Circle Group has achieved reduction in capital investment (machines and dies), saving in cost per part, improved output and reduction in re-melting cost. It also explains the benefits of Team building approach, Kaizen, Multi-skilling and Success story presentation competition.

Human Resource department is playing key role to increase involvement of organisation employees in organisation goal achievement process and motivates them by developing team building approach.

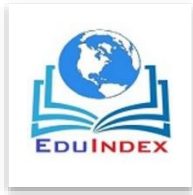
Keywords:

Quality circle, Kaizen, Bottleneck, Cycle time, Productivity, Multi-skilling, LPDC, Cost saving, Knowledge sharing, Team building

Introduction:

In 1950s Japanese quality Guru W. Edwards Deming was described Quality Circle concept, which would be further described by Professor Kaoru Ishikawa in his 1988 handbook. Quality Circle concept based on Team building approach and increases the organisation employee involvement in productivity improvement activity. Quality Circle activity motivate the organisation associates for taking initiative in problem solving process, developing kaizen skill, improving presentation skill and developing positive attitude towards organisation objectives.

‘Productivity improvement’ is one of prime objective for all level of organisation management. Quality circle is group of cross functional associates, who are contributing their



Think India Journal
ISSN: 0971-1260 Vol-22, Special Issue-20
National Conference on
“Role of Technology in Business Sustainability
and Market Transformation” sponsored by
Lexicon Management Institute of Leadership & Excellence , Pune
on Saturday 21st December 2019

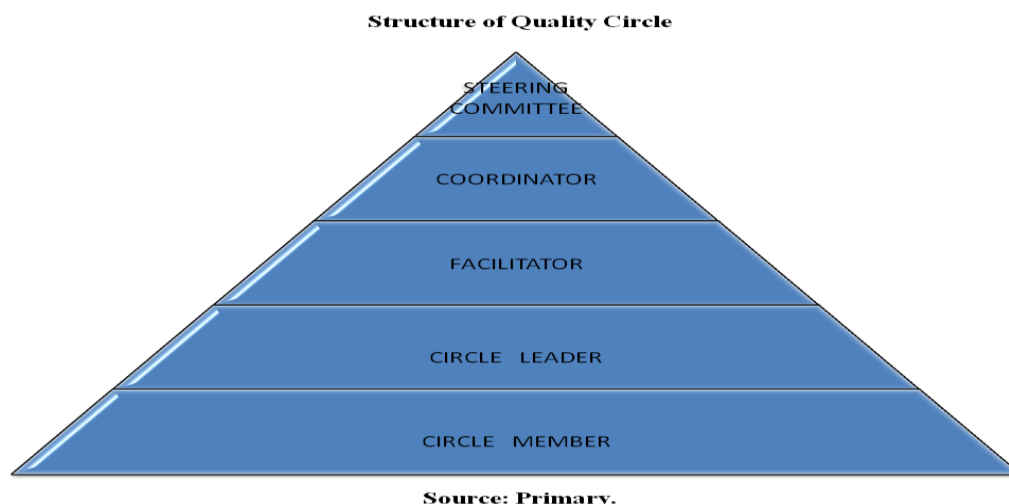


knowledge for increasing value added activities in the process. Quality Circle teams are set their objective as per management challenges and targets.

In India, most of OEM's are facing huge fluctuations in sales prediction. Seasonal unpredicted customer demand is also one of major challenge for OEM and also for their supplier partners. To maintain smooth supply flow and controlling capital investment, 'Productivity improvement' is effective solution for all types of manufacturing industries. Productivity improvement is reduced the cost per part and minimised order lead time.

To achieve 'Productivity Improvement' target is not only applicable for Production department but also other departments like Quality Assurance, Purchase, Maintenance, Marketing and Human resource departments are equally responsible for achieving this objective. To identify employee potential, encourage and motivate them towards organisation targets, educate and train associates with company policy and cultures are the major functions of Human resource department. The **Japanese Union of Scientists and Engineers (JUSE)** were also explained; 'Employee Involvement' is one of challenging task in front of all types of industries. 'Quality Circle Presentation' and 'Kaizen Presentation' are the employee motivational activities, which develops team building approach within organisation employees. Kaizen or small-small improvements are helpful for achieving cost saving, fatigue reduction, work simplification and productivity improvement targets.

Organisation top management has provided directions and guidelines about management objectives and challenges, middle level operation management simplifies these targets and form groups of cross functional associates so that cumulative efforts of these groups should be in line with organisation challenges. Human resource department provides the platform and motivates the organisation associates for participating in such presentation competition.



Productivity improvement through team building approach (Aluminium foundry):

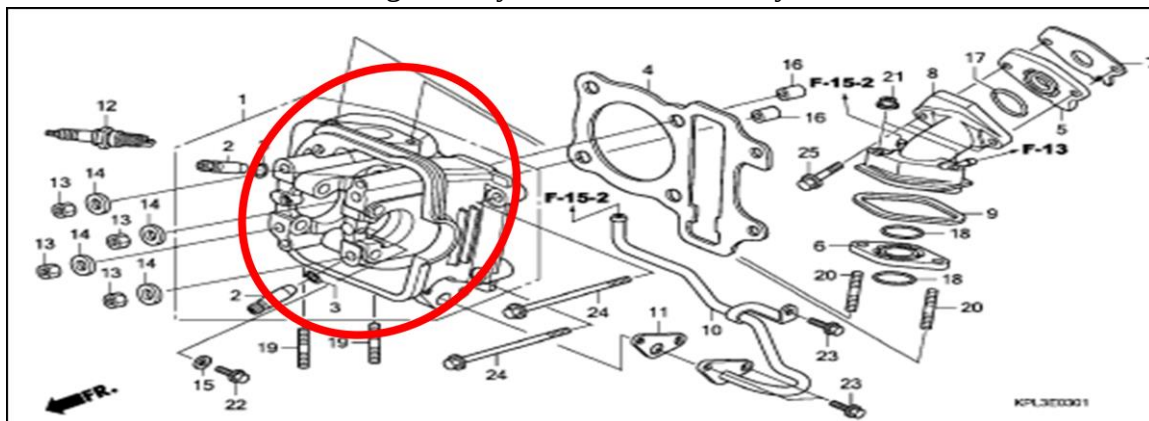
For Risk mitigation, many OEM industries are offloaded their some processes at his supplier partner end, which results reduction in capital investment. Seasonal fluctuation in sales forecast is very critical challenge for operation management. Capital investment decision for festival demand, might be created trouble in production levelling concept so instead of doing capital investment, many OEM's are focusing to improve their productivity. Management has reviewed, his all 4'M' conditions i.e. material, method, manpower and machines. To fulfil seasonal requirements and to control capital investment, organisation has taken challenge for to increase productivity by forming quality circle and kaizen groups.

After reviewing outsource and in-house activities, organisation management has concluded die casting part Cylinder head is most bottleneck material for achieving seasonal peak requirement. Cylinder head is engine assembly part and manufacturing at both in-house and outsource location. Organisation top management has decided to form Cross Functional Team (CFT), which will utilise their core knowledge for improving productivity.

Cylinder head function detail –

Cylinder head is casting part that fits onto top of a Cylinder block in vehicle engine. Cylinder head is functionally very critical; any quality issue in cylinder head will be impacted on engine or vehicle performance. Valve and Spark Plug is mounted on Cylinder head and it provides passage to feed Air + Fuel for combustion and allow exhaust to escape.

Fig. 1.2: Cylinder head Assembly.



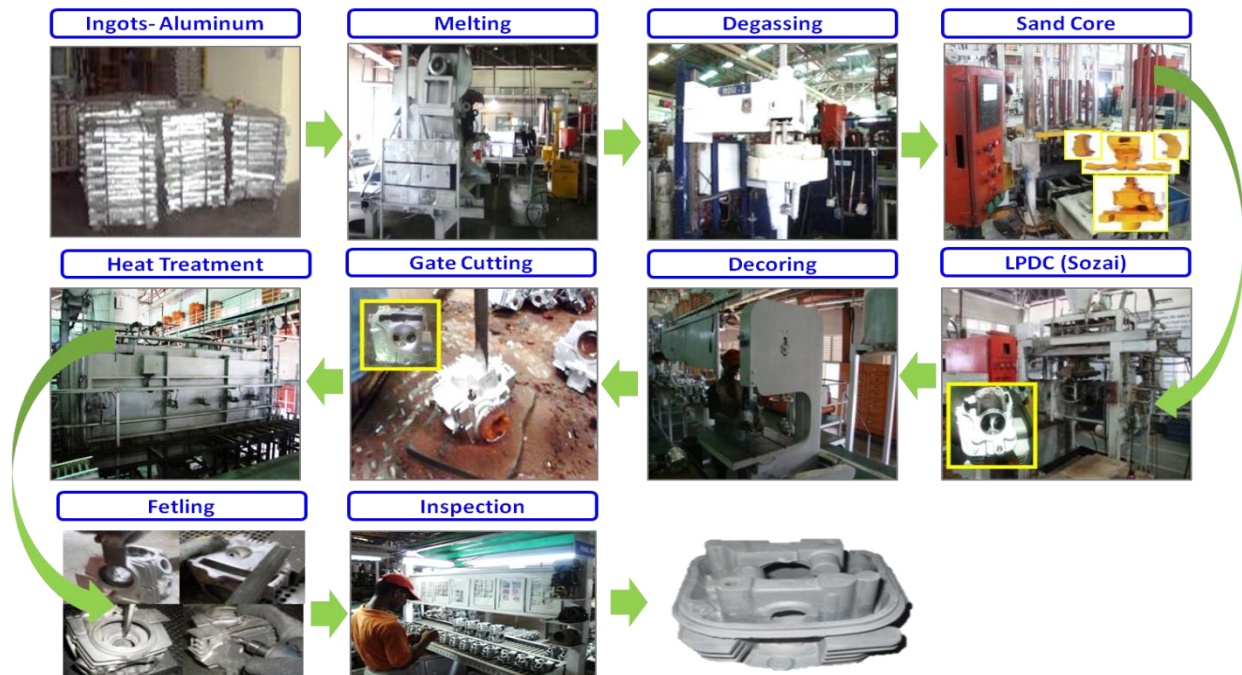
Source: Part List.

Cylinder Head Process study –

Cross functional team (CFT) has discussed with in-house and supplier manufacturing expert for to identify improvement areas. Knowledge sharing concept is very effective to horizontally implementation of good practices at all manufacturing locations and minimise the non-value added activities.

Process Study –

Fig. 1.3: Cylinder head manufacturing process.



Source: Primary.

Cycle time Study & Bottleneck identification –

Cross functional team has studied cycle time of in-house and supplier manufacturing process.

Process Stage	In-house C.T.	Supplier C.T.
Melting	1 Min.	1 Min.
Degassing	1 Min.	1 Min.
Sand Core	1.5 Min.	1.5 Min.
LPDC	6 Min.	6 Min.
De-coring	1 Min.	1 Min.
Gate cutting	1 Min.	1 Min.
Heat treatment	2 Min.	1.5 Min.
Fettling	2 Min.	2 Min.
Inspection	2 Min.	2 Min.

CFT has observed LPDC process is bottleneck process but no such a major variation observed in in-house and supplier manufacturing process.

LPDC Process Cycle time Study:

Fig. 1.4: LPDC process Cycle Time.

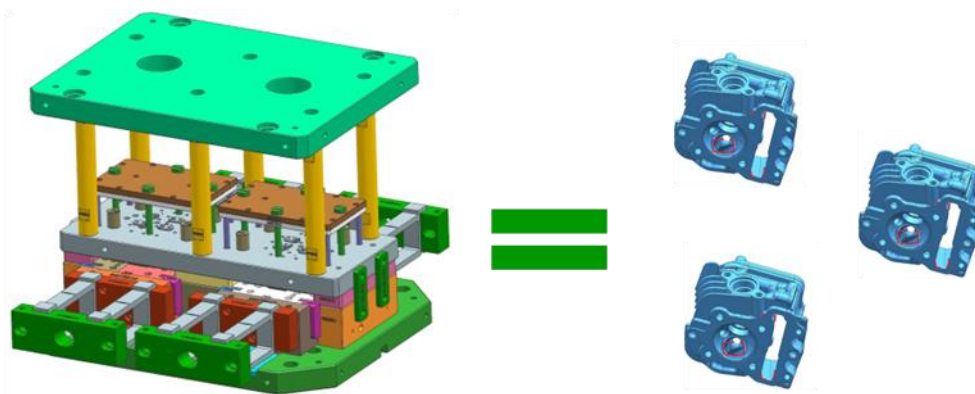
Source: Casting Process.

Manufacturing Facility analysis:

CFT has observed, in-house manufacturing process uses four cavities Die on single machine, which results in-house production output is more than supplier production output. CFT has reviewed feasibility of suppliers LPDC machine to implement four cavities Die. After reviewing machine and die manufacturing design, it was observed that supplier LPDC machines base plate width is less for using four cavities Die. Die manufacturing team also explained, 490mm minimum base plate size requirement for to use four cavities Die.

After in-depth discussion with supplier and in-house manufacturing expert, die and machine design expert; it was concluded that three cavities Die could be developed and supplier LPDC machines base plate size also feasible for it. Other relevance factors like stalk tube design, pressure etc. also evaluated and after some design modification; these are also feasible to use three cavities Die.

Fig. 1.5: Three Cavities Die Design.



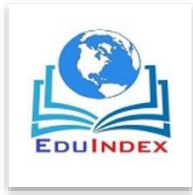
Source: Primary.

Benefits:

- 1. Productivity Improvement** – Production output increased by 1.5times of earlier available production Capacity.
- 2. Capital Investment** – Three cavity design concept reduces the machine and die manufacturing capital investment.
- 3. Re-melting cost** – This concept reduces (Gates + Runner) re-melting cost.

Conclusion:

‘Team building approach’ is one of important element for achieving success in organisation goal achievement process. Human Resource (HR) department plays very essential role to increase morale and motivates associates for participating in organisation target achieving process. HR department provides platform for Quality circle and Kaizen



Think India Journal
ISSN: 0971-1260 Vol-22, Special Issue-20
National Conference on
**“Role of Technology in Business Sustainability
and Market Transformation”** sponsored by
Lexicon Management Institute of Leadership & Excellence , Pune
on Saturday 21st December 2019



presentation etc activities, which encourage associates for sharing knowledge and creating Team building approach’.

Bibliography and References:

- 1) Ritesh Kumar Shrivastava, Dr. Sridhar K - PRODUCTIVITY & QUALITY IMPROVEMENT THROUGH KANBAN - A CASE STUDY, Shrivastava, et al., International Journal of Advanced Engineering Research and Studies, (2015).
- 2) Shantanu Welekar, Shantanu Kulkarni - Quality Circle To Improve Productivity, International Journal of Engineering Research and Applications (IJERA), (2013).
- 3) Quality Circle – Wikipedia. Date: 24/05/2019, Time: 07:15pm.
- 4) BOYDELL_2011_pub_Ch7_Capacity_planning_and_management.pdf
https://researchportal.port.ac.uk/portal/files/176643/BOYDELL_2011_pub_Ch7_Capacity_planning_and_management.pdf Date: 15/04/2018; 03:40pm.
- 5) F. Bonollo, J. Urban, B. Bonatto, M. Botter - Gravity and low pressure die casting of aluminium alloys: a technical and economical benchmark. Date: 21/08/2019; 1:00pm.
- 6) Die casting – Wikipedia.
https://en.wikipedia.org/wiki/Die_casting Date: 05/10/2019; 10:00pm.
- 7) LPDC
<https://www.flow3d.com/products/flow-3d-cast/permanent-mold/lpdc/>
Date 09/12/2019; 08:30pm.
- 8) Bottleneck (production) - Wikipedia.
https://en.wikipedia.org/wiki/Bottleneck_production Date: 19/07/2018; 08:10pm.