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"Yield Improvement in Press Shop"

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Abstract: To maintain competitiveness and maximum profit in today's marketplace, one among the foremost vital aspects that organizations should concentrate on is scrap reduction. Metal forming is the method where by the dimensions and shapes are obtained through the plastic deformation of the material using press machine and press tools. The optimization of method to extend yield whereas reducing price could be important challenge. To extend yield, manufacturers are trying to decrease batch reduction and cutback waste.

The aim of the research is to analyze the scrap levels related to variance occurring within the press machine in Esteem press parts industry. The results facilitated to spot the doable causes of scrap and can cause associate applicable answer to support short run in cutback scrap. During this report, technology and management tools like value analysis and value engineering, kaizen are used for production improvement in industry.

Keywords: Scrap Reduction, Kaizen, Value analysis, Value Engineering, PDCA.

I. INTRODUCTION

Yield improvement is defined as the ratio of the number of products that can be sold to the number of products that can be manufactured and to increase the sold product. Now we all know what is yield improvement. If defined in simple word, it is nothing but increase in productivity. Yield management or improvement can be applied to any field like operation, manufacturing, medical, etc. In this paper, yield improvement technique is applied in press shop to reduce scrap and produce another part from that leftover and increase productivity. Esteem Press Pvt Ltd. company produces various stamping products, where there are various press machines like mechanical press, hydraulic press, pneumatic press etc. are used. After producing a part some portion of the metal sheet is left, generally called as scrap. This scrap is further sold at very low cost. So instead of selling it a low cost, it can be further utilized for child parts.

Fig (1): Scrap or leftover

In this paper, technology and management tools like Value Analysis and Value Engineering, Kaizen, PDCA are used for production improvement in industry. This project focuses on the complete utilization of scrap or leftover, and producing more child parts which are further used in the final products as requirement.

II. PROBLEM STATEMENT

The scrap is basically a waste material, which is further sold. The supervisor has an opportunity, if he can recycle and reuse that scrap for further useful work. Sometimes it is used to make another part of same grade. Such practice saves extra material to purchase and save cost.

Currently in this industry various sheet metal part are produce. Their annual consumption of metal strip is 75:25 proportions which are good enough but still they are looking or finding opportunity to reduce scrap.

Factor consider while selecting left-over: -

1) Size of metal sheet.
2) Monthly production of product from which scrap is obtained.
3) Weight of left-over.
4) Market rate and scrap rate of that left-over.
5) Material specification (grade).

While doing this project we have identified various products which have a large scale of leftover, which are listed below.

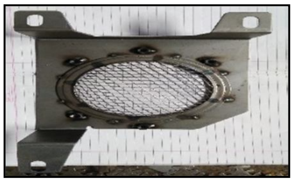
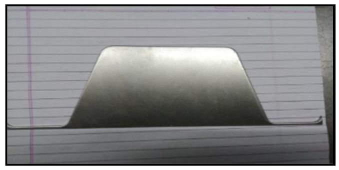
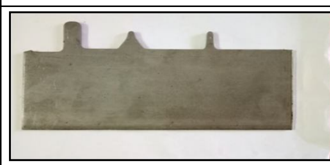
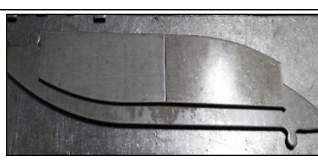
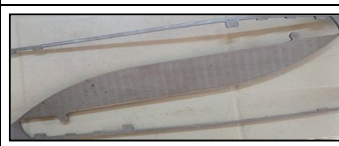
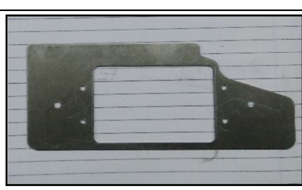
Scrap	Product images	Leftover obtain from product.	Scrap part name	Material (grade)	Gross weight (Kg)
Part-1			Blower Bracket – 1280	CR	0.11
Part-2			50 HP Bottom Bracket	HR	0.29
Part-3			Blower Bracket – 1280	CR	0.27
Part-4			207 Radiator Member Support	HR	0.16
Part-5			FFC 1616 Right Channel	HR	0.45
Part-6			Kider Bkt KSP50 3H37	HR	0.35
Part-7			Refresh Insert RH/LH (YT6867200 395.5)	CR	0.034

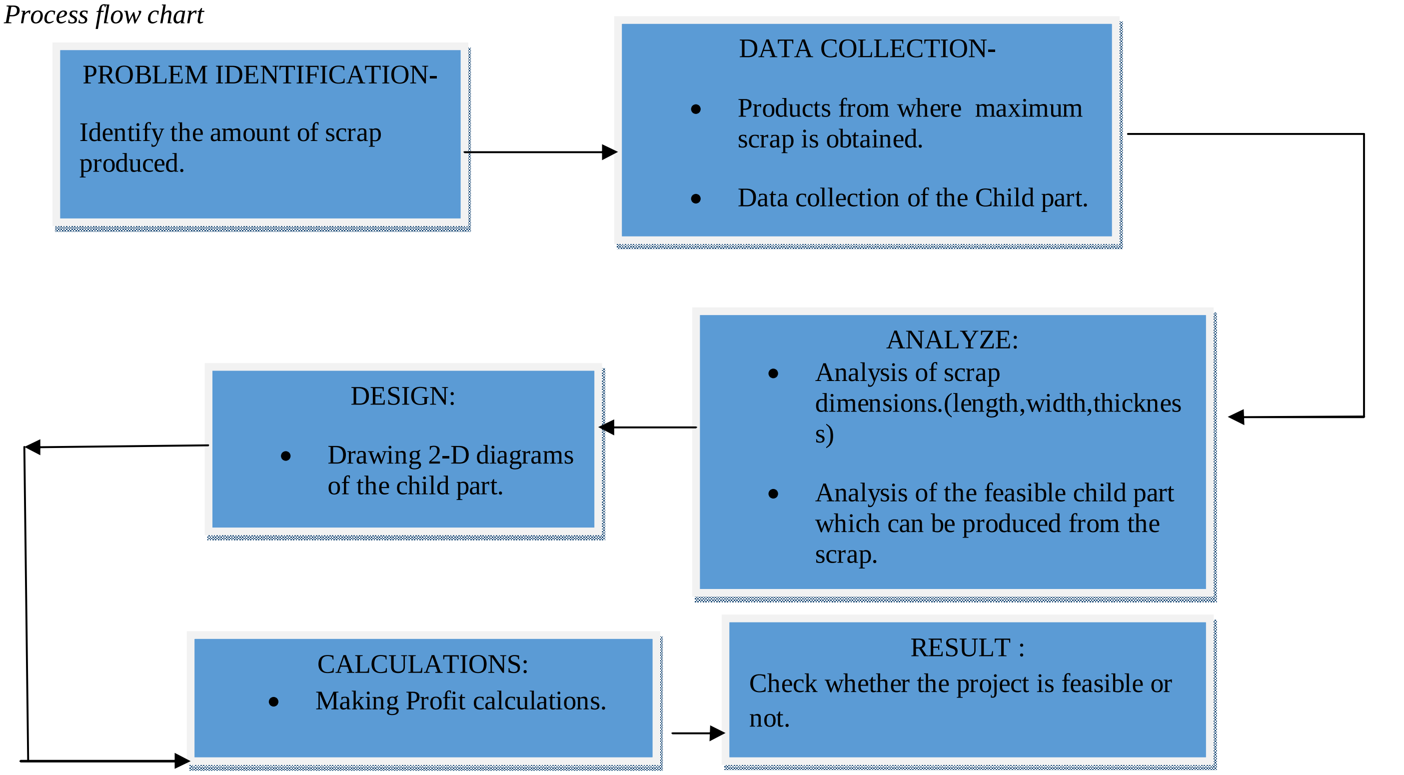
Table (1): Products and Their Leftovers

III. PROJECT METHODOLOGY

1) *Kaizen*: "Kai" means change, and "Zen" means good (for the better). Basically kaizen is for small improvements, but carried out on a continual basis and involve all people in the organization. The principle behind is that "a very large number of small improvements are move effective in an organizational environment than a few improvements of large value.
2) *Value analysis and value engineering:* According to value analysis and value engineering, value analysis is an organized procedure for efficient identification of unnecessary cost. It can also describe as "the study of relationship of design, function and cost of any product, material or service with the object of reducing its cost through modification of design or material specification manufactured by more efficient process, change in source of supply (external or internal)"

Value engineering is systematic effort to improve the value of a product, project or system and optimize life cycle cost.it is the process that identifies opportunities to remove unnecessary cost while assuring that the quality, reliability, performance and other critical factor meet customer's expectation.[6]

A. Process flow chart



By observation and collecting data from the industry we found that the scrap production in the seven products is more enough to utilize further. The approx. dimension of scrap their monthly production etc. listed below.

Observation table:

Scrap no	Part description from which scrap obtained	Monthly Production	Details of usable portion			
			Length (mm)	Width (mm)	Thickness (mm)	Mass in Kg. (l*w*t*0.00000785)
Part1	Blower Bracket – 1280	200	114	73.3	2	0.09321
Part2	50 HP Bottom Bracket	500	250.3	73.3	2	0.28804
Part3	Blower Bracket – 1280	200	121	140	2	0.2659
Part4	207 Radiator Member Support	300	214.28	36.25	2	0.1219
Part5	FFC 1616 Right Channel	1000	216.13	83.26	3	0.424
Part6	Kider Bkt KSP50 3H37	2000	87	50.5	3	0.1035
Part7	Refresh Insert RH/LH (YT6867200395.5)	700	63.44	46.24	1.5	0.0345

Table (2):- Leftover Specification

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IV. CALCULATION

After getting left-over we started calculating the value of that leftover (i.e. market rate, scrap rate, value addition, monthly saving opportunity etc.). After calculating value of leftover, we came to know that the value of left-over is more, monthly nearly about Rs. 18,724.69/- which is shown in below calculation so we have to opportunity to utilize it.

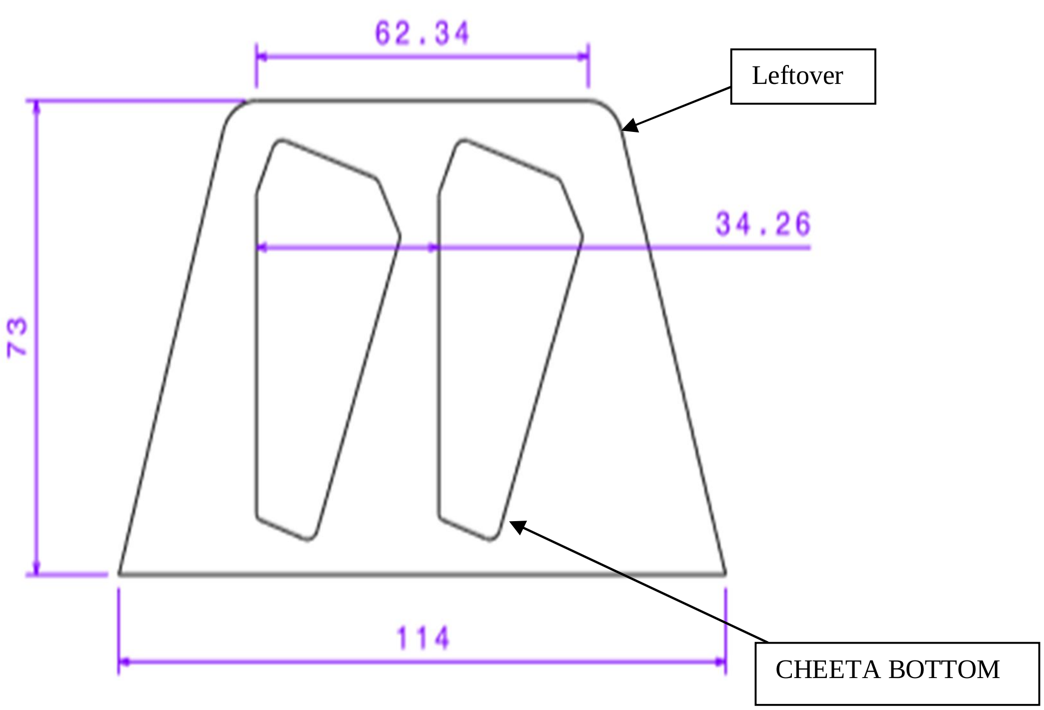
Then next start to collect data of child part from storage department. While selecting child part it is should be fitted in leftover according to leftover specification.

Factor consider while selecting child part: -

1) Over all dimension and thickness.
2) Material specification.
3) Market rate of child part

Child part which are obtained from leftover. Their drawings and calculations are as follows.

Part 1-Blower bkt 1280 drawing



Part blank-

Length =114mm, Width =73.3mm, Thickness =2mm

Mass= Length*Width*thickness*density=114*73.3*2*0.00000785=0.09321 kg.

4) Fair market value:
   Mass*Market Rate of CR Material=0.0921*45=4.19/-
   Scrap value - Gross Weight*Scrap Rate
   =0.11*19= 2.09/-
5) Value addition-
   Fair market value – scrap value = 4.19 – 2.09 = 2.10/-
6) Monthly potential saving-
   Value addition*monthly production = 2.10 * 200 = 420.89/-
7) Monthly profit after producing child part-

=Quantity of child part produce*market rate of child part*monthly production

= 2 * 1.3 * 200

= 520/-

Similarly, other calculations,

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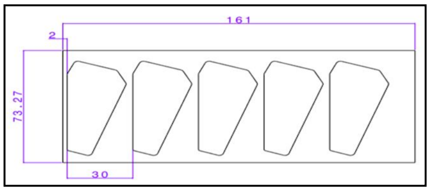
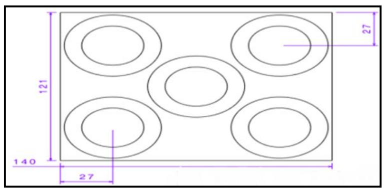
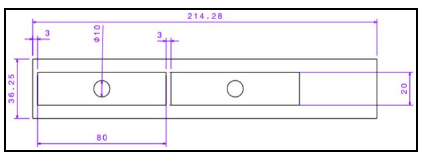
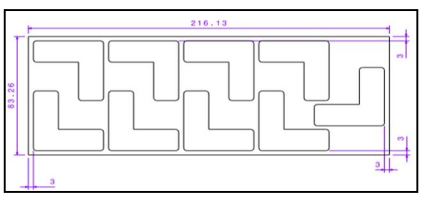
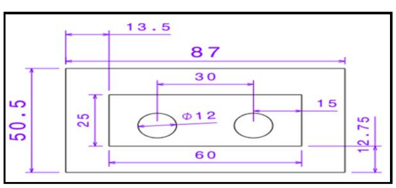
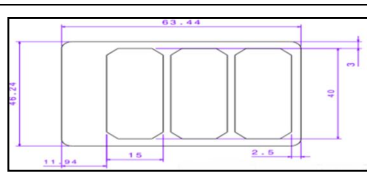
Part description from which scrap obtained	Drawings	Child Part Number & Name	Fair market value	Scrap value	Value addition	Monthly potential saving	Monthly profit after producing child part
50 HP Bottom Bracket		90-CHEETA BOTTOM RIB	11.52	5.51	6.01	3005.80	3,250
Blower Bracket - 1280		18-LPO 1618 M/S MTG BKT WASHER	11.97	5.13	6.84	1367.1	1,550
207 Radiator Member Support		62-LPT 407 M/S C BKT	4.87	3.04	1.84	551.42	4,320
FFC 1616 Right Channel		132-3721 TOP / 2518 TOP SMALL 'L'	16.948	8.55	8.398	8398	10,350
Kider Bkt KSP50 3H37		104-1418 BOTTOM NUT PLATE	4.1386	1.965	2.17	4345.6	4,280
Refresh Insert RH/LH (YT686720039 5.5)		157-M-STAR M/S CLIP	1.554	0.646	0.908	635.85	1,827

Table (3):-Calculation Table

After calculating, the monthly utilization of scrap is 18,724.69/- and after production of child parts, monthly profit is 26,097/-. So the total profit is about 44,821.69/-.

Now it is necessary to calculate whether the project is feasible or not. This is achieved by subtracting the machine cost and labor cost from the total profit obtained. While subtracting this, we considered total cost that is scrap utilization and child part monthly profit. In this case we have not procured new sheets so we don't need to consider an additional cost of the new metal sheets.

8) Labour cost: -
Cost of labour per day is 350/-
Monthly labour cost = 350*30 =10,500/-
9) Machine cost: -
Machine operates 8 hours per day and its consumption is 18 kW per day so monthly electricity consumption is,
Total electricity consumption=18*30=540 kW
Electricity bill=540*10=5400/-
10) Total operating cost: -
Labour cost + Machine cost = 10500 + 5400
= 15,900/-
11) Check feasibility of project: -
Total cost – Total operating cost = 44,821.69 - 15,900
= 28,921.69/-
From above calculation we understand that the project is feasible. And ready to implement.

V. RESULT TABLE

	Monthly	Yearly
Total Savings By Scrap Utilization.	18,724.69/-	2,24,669.22/-
Total Profit After Producing Child Part.	26,097/-	3,13,164/-

VI. CONCLUSION

As shown above, after doing the calculations (i.e. dimensions, profit calculations) the total profit after utilizing the scrap for production of child parts was Rs 44,821.69/- per month. But for the child parts production extra labor cost and machining cost should be considered. Finally, we compared the total profit with the machining and labor cost (15,900/-) per month, and the value was positive (28,921.69/-) per month, which indicates that the project/technique is feasible for implementation.

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