RESEARCH ARTICLE

TO ESTIMATE THE DIS-ASSEMBLY COST AND PROFIT / LOSS OCCUR WHEN OF ADAMAGED CARS/ AUTO VEHICLE COMPONENTS ARE DUMPED OR REUSE AFTER REMANUFACTURING / OR NOT. (WASTE MANAGEMENT PHILOSOPHY)

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ARTICLE INFO	ABSTRACT
	Cost analysis is very important for any development of the new methodology if this is profitable we adopt it. Therefore in this study we estimate the dis-assembly cost for damaged car/ auto vehicles/ old car and find out the profit or loss occur. Here we set all the cost in random variable and found the profit because in bigger city the capital cost is more. We face a lot of problem to staying old /damaged car/auto-vehicle in every big city at warehouses. Therefore cleanliness of ware houses is necessary from old/damaged car / auto-vehicle in cities.

INTRODUCTION

Development of dis-assembly line and disassemble the auto vehicle we do expenditure for this work. For reuse or recycling the components by manufacturing or heat treatment process we also do the expenditure. After making new product / reuse of component to sell it we earn money and the escape of land area (as a ware house of old vehicle) we also release the money. For every expenditure of money and earning of money have a fixed cost and variable cost. For profit Expenditure is less than earning money while loss expenditure is more than earning money. In this research paper we analysesif reprocessing the damaged /old car / auto-vehicle in disassembly production line, the process is beneficial for the industries or not for the money point of view. Here for expenditure, the fixed cost are land area where the disassembly production line is set and disassembly production line development etc. while the variable cost is removing the auto components in disassembly line, office cost, labor cost, manufacturing cost, heat treatment cost etc. For earning money, fixed cost are release land area by damaged /old car/auto-vehicle and the variable cost are reselling the new

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recycles components component of auto vehicle or making other product selling. Here we develop the formula to understand the particular process is beneficial for us or not.

Theory

Here in a dis -assemble production line we take the batch size of 100 damaged cars / auto vehicle to dis -assemble it. For calculating the dis-assemble (disassembly production line and recycling the components etc.) expenditure cost and earning money for releasing the land area and recycles the components reselling. Here we know that there are five major component and other are assumed to be subcomponents of a damaged cars / auto vehicle to dis- assembled them by a robotic arm (Mohammad TariqueJamali, 2017). These are shown below in a tabular form to calculate fixed cost and variable cost of all of these disassemble components expenditure and also calculate the earn money for all these components as for fixed cost and variable cost. We do the coding for this this is helpful for making software (computer Program) to calculate the profit or loss.

These are given below in tabulating form

For expenditure, The fixed cost are Land area and development of disassembly production line we say that it is

capital cost. It will be assume that for 10 years here we calculate the fixed cost for every 100 (batch) Damaged Car/ auto vehicle. Earning fixed cost for rescue land are also calculate for every 100 (batch) damaged cars/ auto vehicle.

For variable cost we say that

Variable cost of the components (VCC) are equal to Components disassembly cost (CDC)+ Labor cost(LC) +Manufacturing cost /heat treatment cost (MHC) + Miscellaneous Cost (MC) miscellaneous Cost (MC) are that the cost are not fully defined but it is used in expenditure like stationery for office work, maintenance cost and office cost etc.

Therefore we say that

VCC = CDC+ LC+MHC+MC

EVCC (Earning Variable Component Cost) = Selling cost of the components = D_{ij} SC

For first main component D1 means disassembly of car wheels which have suppose two sub component like D11- Disassemble tire, D12-Disassemble rim from damaged car / auto vehicle therefore D11CDC means disassemble tire cost, D11LC means disassemble tire labor cost vice versa given in table 1 below

Therefore variable cost of expenditure for the component Disassembly car wheels are given below

The variable cost of components of disassembly car wheels are
V $D_{ij}1$ = (D_{ij}CDC + D_{ij}LC + D_{ij}MHC + D_{ij}MC) = (2+3+ 6 +4) = \$15

Variable cost for earning are EV $D_{ij}1$ = D_{ij} SC = \$25

Similarly for second main component disassemble the car body D2 which have sub component like

D21- disassemble the car wind screen ,doors, D22-disassemble the car roofs therefore D21 CDC means disassemble car wind screen cost, D21 LC means disassemble wind screen labor cost vice versa given in table 2 below

Therefore variable cost of expenditure for the component Disassembly car body are given below

The variable cost of components of disassembly car body are
V $D_{ij}2$ = (D_{ij}CDC + D_{ij}LC + D_{ij}MHC + D_{ij}MC)= (3+ 4+ 2 +2)= \$ 11

Variable cost for earning are EV $D_{ij}2$ = D_{ij} SC = \$5

Similarly for third main component disassemble the chassis D3 which have sub component like

D31- disassemble the rare axle, D32- disassemble the live axle, D33- disassemble the shock absorber, D34- disassemble the muffler ,D35- disassemble the Fuel tank therefore D31 CDC means disassemble car rare axle cost, D31 LC means disassemble rare axle labor cost vice versa given in table 3 below

Therefore variable cost of expenditure for the component Disassembly Car Chassis are given below

The variable cost of components of disassembly car chassis are
V $D_{ij}3$= (D_{ij}CDC + D_{ij}LC + D_{ij}MHC + D_{ij}MC) = (11+11+13+10)= \$45

Variable cost for earning are EV $D_{ij}3$ = D_{ij} SC = \$50

Similarly for four main component disassemble the car Engine D4 which have sub component like D41- disassemble the Engine Fan, D42- disassemble the piston, D43- disassemble the transmission assembly, D44- disassemble the Battery ,D45- disassemble the Fuel injector , D46 -disassemble the radiator therefore D41 CDC means disassemble car engine fan cost, D41 LC means disassemble car engine fan labor cost vice versa given in table 4 below

Therefore variable cost of expenditure for the component Disassembly Car Engine are given below

The variable cost of components of disassembly car chassis are
V D_{ij} 4 = (D_{ij}CDC + D_{ij}LC + D_{ij}MHC + D_{ij}MC) = (14+12+12+12)=\$50

Variable cost for earning are EV D_{ij} 4 = D_{ij} SC =\$50

Similarly for four main component disassemble the car Accessories D5 which have sub component likeD51- disassemble the steering assembly,D52-disassemble the brakes, D53-disassemble the pressure gauge, D54-disassemble the clutches, D55-disassemble the spark plug, D56 for disassemble alternator. Therefore D51 CDC means disassemble car Accessories cost, D31 LC means disassemble Accessories labor cost vice versa given in table 5 below

Therefore variable cost of expenditure for the component Disassembly Car Accessories are given below

The variable cost of components of disassembly car chassis are
V D_{ij} 5 = (D_{ij}CDC + D_{ij}LC + D_{ij}MHC + D_{ij}MC) = (14+10+3+11)= \$38

Variable cost for earning are EV D_{ij} 5 = D_{ij} SC =\$ 10

For Disassembly the main components of the car only Cost of Labor and Cost of disassembly car main components are effective. There are given below in tabulated 6 form

Therefore main components variable cost are

V D_i = (D_i CDC + D_i LC) = (21 +19)=\$ 40

Therefore variable cost of expenditure in damaged /old car/ Auto vehicle disassembly is

Variable components Cost (VCC)= V D_i + (V D_{ij} 1 + V D_{ij} 2 + V D_{ij} 3 + V D_{ij} 4 + V D_{ij} 5)

For batch production car are assumed to be 100 therefore VDC are

Variable component Cost (VCC) = 100 X (V D_i + (V D_{ij} 1 + V D_{ij} 2 + V D_{ij} 3 + V D_{ij} 4 + V D_{ij}5))

Table 1. Disassembly of car wheels (D1)

Disassemble component	CDC ($)	LC ($)	MHC ($)	MC ($)	Selling cost SC(earning)($)
Disassemble tire D11	D11CDC = 1	D11LC= 2	D11MHC =3	D11MC =2	D11 SC =15
Disassemble rim D12	D12CDC = 1	D12LC= 1	D12MHC =3	D12MC =2	D12 SC = 20
Total VCC = VD$_{ij}$	DijCDC=2	$_{Dij}$LC= 3	D$_{ij}$MHC =6	D$_{ij}$MC =4	D$_{ij}$ SC = 25

Where i, j means 1, 2, 3 ,4 ,5………………….

Table 2. Disassemble the car body (D2)

Disassemble component	CDC ($)	LC ($)	MHC ($)	MC ($)	Selling cost SC(earning) ($)
D21	D21CDC = 2	D21LC = 2	D21MHC = 0*	D21MC =1	D21 SC = 0*
D22	D22CDC = 1	D22LC = 2	D22MHC = 2	D12MC =1	D22 SC = 5
Total VCC = VD$_{ij}$	DijCDC =3	$_{Dij}$LC =4	D$_{ij}$MHC =2	D$_{ij}$MC = 2	D$_{ij}$ SC = 5

Table 3. Disassemble the car chassis (D3)

Disassemble component	CDC ($)	LC ($)	MHC ($)	MC($)	Selling cost SC(earning) ($)
D31	D31CDC = 3	D31LC = 3	D31MHC =5	D31MC =3	D31 SC = 20
D32	D32CDC =3	D32LC =3	D32MHC =5	D32MC = 3	D32 SC =20
D33	D33CDC =1	D33LC =1	D33MHC =0*	D33MC = 1	D33 SC =0*
D34	D34CDC = 1	D34LC =1	D34MHC =0*	D34MC =1	D34 SC =0*
D35	D35CDC = 3	D35LC =3	D35MHC =3	D35MC = 2	D35 SC = 10
Total VCC = VD$_{ij}$	DijCDC =11	$_{Dij}$LC =11	D$_{ij}$MHC =13	D$_{ij}$MC =10	D$_{ij}$ SC = 50

Table 4. Disassemble the car Engine (D4)

Disassemble component	CDC($)	LC ($)	MHC($)	MC($)	Selling cost SC(earning) ($)
D41	D41CDC = 3	D41LC =3	D41MHC =3	D41MC =2	D41 SC =10
D42	D42CDC = 2	D42LC = 1	D42MHC =2	D42MC =2	D42 SC = 10
D43	D43CDC = 5	D43LC =4	D43MHC =4	D43MC =2	D43 SC =15
D44	D44CDC =1	D44LC =1	D44MHC =2	D44MC =2	D44 SC = 15
D45	D45CDC = 1	D45LC =1	D45MHC =0*	D45MC =2	D45 SC =0*
D46	D46 CDC = 2	D46LC =2	D46 MHC = 0*	D46MC =2	D46 SC =0*
Total VCC = VD$_{ij}$	DijCDC=14	$_{Dij}$LC =12	D$_{ij}$MHC =12	D$_{ij}$MC =12	D$_{ij}$ SC =50

Table 5. Disassemble the car Accessories (D5)

Disassemble component	CDC ($)	LC ($)	MHC ($)	MC ($)	Selling cost SC(earning) ($)
D51	D41CDC= 4	D41LC=3	D41MHC =0*	D41MC=3	D41 SC =0*
D52	D42CDC = 4	D42LC =3	D42MHC =0*	D42MC =2	D42 SC =0*
D53	D43CDC =2	D43LC =1	D43MHC = 0*	D43MC =2	D43 SC =0*
D54	D44CDC = 2	D44LC =1	D44MHC =2	D44MC =2	D44 SC =5
D55	D45CDC =1	D45LC =1	D45MHC =0*	D45MC =1	D45 SC =0*
D56	D46 CDC =1	D46LC =1	D46 MHC =1	D46MC =1	D46 SC =5
Total VCC = VD$_{ij}$	DijCDC= 14	$_{Dij}$LC =10	D$_{ij}$MHC =3	D$_{ij}$MC =11	D$_{ij}$ SC = 10

Table 6. Disassemble of the damaged car/ auto vehicle main component (D$_i$)

Disassemble component	Disassembly main Component cost CDC	Disassembly Labor cost DLC
D1 car wheels	D1CDC = 3	D1 DLC =3
D2 car body	D2CDC = 3	D2 DLC =4
D3 car chassis	D3 CDC =5	D3 DLC =4
D4 car Engine	D4 CDC =5	D4 DLC =4
D5 car Accessories	D5 CDC =5	D5 DLC =4
Total V D$_i$	D$_i$ CDC = 21	D$_i$ LC= 19

Similarly for earning variable cost for 100 (assumed for batch production) cars

Earning variable Component cost(EVCC) = 100 x(sum of all the selling components cost)

EVCC = 100X(EV D$_{ij}$ 1 + EV D$_{ij}$ 2 + EV D$_{ij}$ 3 + EV D$_{ij}$ 4 + EV D$_{ij}$ 5)

Fixed for Expenditure are

Expenditure Fixed cost (EFC) = Capital cost (Land cost) + Development of disassembly line cost

But for earning Fixed cost = Rescue Land area by the Damaged /old cars / auto vehicles

= Capital cost (CC)

Here we assume that for development of disassembly line and land cost is assumed for 10 years therefore we used here only for 100 cars for batch production is to be $3000 for 100 car While the earning Fixed cost or capital cost of rescue land area by the Damaged /old cars / auto vehicles are more Therefore we assume to be Equal to $ 10000

Therefore

Profit or loss = ((Capital cost (CC) +Earning variable Component cost EVCC) – (Expenditure Fixed cost (EFC)+ Expenditure variable Component cost(VCC)))

Profit or loss = ((CC + EVCC) - (VCC + EFC))

If the expenditure is more than the earning loss occur

If the expenditure is less than the earning profit occur

RESULTS

For examination of profit or loss we assume the Expenditure of the component and earning of the components in above table. Here all cost are random values depends on observation of disassemble the components (assumption basis) it will be change.

* Here we explain that if the component are fully damaged the value of manufacturing cost and selling cost become zero.
Therefore according to the developed formula
For batch production car are assumed to be 100 therefore VDC are

Variable component Cost (VCC) = 100 X (V D_i + (V D_{ij} 1 + V D_{ij} 2 + V D_{ij} 3 + V D_{ij} 4 + V D_{ij}5))
VCC = 100 X (40 + (15 +11+ 45 +50+ 38)) = =100 X199 = $ 19900

Similarly for earning variable cost for 100 (assumed for batch production) cars

Earning variable Component cost(EVCC) = 100 x(sum of all the selling components cost)

EVCC = 100X(EV D_{ij} 1 + EV D_{ij} 2 + EV D_{ij} 3 + EV D_{ij} 4 + EV D_{ij} 5)

EVCC = 100 X (25+ 5 + 50 + 50 +10) = 100 X 140 = $14000 Therefore

Profit or loss = ((Capital cost (CC) +Earning variable Component cost (EVCC) – (Expenditure Fixed cost (EFC) + Expenditure variable Component cost (VCC)))

Profit or loss = ((CC + EVCC) - (VCC + EFC))

Here Capital cost (CC) for earning = $8000 (assumption)

Expenditure Fixed cost (EFC) = $ 3000 (assumption)
= ((10000 + 14000) – (3000 + 19900)
= 24000 – 22900 = $1100

Here we see that if capital cost for rescue land area is more than triple than the profit is possible. we not increase the selling cost because these items are not new and are second for use.

Conclusion

From results we conclude that

- If capital cost of lands area is more, than we apply the reprocessing (Recycle) of old car / damaged car
- If wastage of old car/ damaged car/ auto vehicle are Problem for environment than we apply the reprocessing (Recycle) of old car / damaged car
- This formula is beneficial for the Car industries/ Auto vehicle who exchange the old car to new cars. They pick up old cars / damaged car in minimum amount and set a disassembly there and utilize more components to make new modified components.
- Software engineer make a software to calculate the exact profit or loss for every car to utilize this coding

REFERENCES

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