GP METHOD - BETWEEN THEORY AND PRACTICE

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Wherever manufacturing activities where services are provided and work, there are costs. In circumstances where resources are relatively limited, companies should try to achieve what is needed for business. Competition is becoming tougher and tougher after 1990 the economic environment has made it costly the decision error caused by the reduced amount of information on costs. The work aims to analyze the theoretical and practical calculation method Georges Perrin. It will consider on the one hand to analyze the importance of the right choice of costing methods in an economic entity, on the other hand highlight the advantages and disadvantages of the method and analyzed the situations in which is opportunity or its use.

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Introduction

Method G. P. appeared for the first time in France, its name from the initials of its author Georges Perrin.. The aim of the method is the calculation of unit cost as accurately using equivalence factors called GPs. GP is a unit of measurement that expresses the overall production costs of production required to manufacture one unit of standard product which is called "production effort." (M.Epuran - 1999)

By "production effort" can be provided according to this method, the homogeneity of production an economic unit, regardless of its variety, method of manufacturing the venue. That requires human effort to produce goods, materials, money that the property to be included in economic calculations which show how to distribute the costs. (I.Medesan - 2004)

Among the expenses that determine the "production efforts" can establish rapport by calculating the "indices or coefficients of equivalence" GPs appointed for each product manufactured. (A.Baciu - 2001)

2. Method of application steps G. P.

1) The list of operations of the manufacturing process

Based on economic and technical documentation establish a list all operations of product development, grouped into basic operations or directly productive, auxiliary and servicing operations. The pass lists drawn at each operation during working properly and / or quantity of products manufactured in a unit of time.

2) Determination of imputable costs and logical imputation criteria (key repartition)

With accounting documentation will establish groups that are considered imputable costs. Within these costs do not include those related to the consumption of raw materials. Costs considered imputable appear at this stage in the form of total amount. For each cost element will be set logical imputation criterion, called key repartition, then used in other stages of the GP method

3) Determination of costs not imputable

At this stage aims to identify all elements of cost to be included in this cost category. Method G. P. seeks to minimizing the costs not imputable by finding key repartition, so the largest in total production costs imputable to the category. (E.Barbu Spatariu - 2004)

4) Determination of the zone each operation

Determining these costs is achieved by applying each cost element repartition key established criteria of causality. In fact, these costs are indications schedule (partial or total) for each operation.

5) Choosing base product or to the standard that is unity equivalence or GP

Product or Article basic standard is to be determined GP's (equivalent indices) for each product. (F.Ineovan - 2002) Product or article considered the most representative basic economic unit is the one that provides all the information needed to calculate product cost.

6) The calculation of the equivalent base

After setting the basic product or item is calculated index equivalent of base (or GPb Ib), where the relation:

$$\sum_{i=1}^{n} \frac{K_i}{g_i}$$

where: Ki = total imputable cost of each operation;
g_i = the number of physical units produced per hour per job (production scheduled);
i=1,2,..,n = the number of operations.

This index is, in fact, GP (total) planned the basic product.

7) Calculation of equivalence indices for each operation of the technological process

Once the basic equivalence index or GP planned to determine the costs attributable to normal time or scheduled operations of each GPs expressed, the number of GPs in each operation. These values are actually "equivalence zone index" for each operation and express the effort required to manufacture the product. (A.Trifan – 2006).

The formula for determining the GP of the operation is as follows:

$$GP_0 = \frac{k}{GPb}$$

where: k = the cost associated with each operation imputable;
GPb = GP planned production base (base equivalent index)

8) Calculation of equivalence indices for each product called GPs on products and production serving equivalence.

Indices of partial equivalence or partial GP sites of a product is calculated by the formula:

$$GP_p = \frac{GP_0}{Q_0}$$

where in the GP0 = GP operation (index operation equivalence);
Q_0 = Quantity (production) scheduled time

9) Setting the unit cost calculated based on GP's

At this stage they are considering spending imputable and non-imputable. The computational model uses one of the following formulas:

$$GP_e = \frac{K_i}{Q_0} + \frac{K_n}{Q_0} \quad (1) \qquad GP_e = \frac{K_i + K_n}{Q_0} \quad (2) \qquad GP_e = \frac{K_t}{Q_0} \quad (3)$$

where: GP_e= cost of G.P
K_i = total actual costs imputable;
K_n = total actual costs not imputable;
K_t = total actual costs ($K_t = K_i + K_n$)
Q_0 = physical volume of production in units G.P.

10) Determination of partial actual unit cost of each product and the cost effective per unit

Partially effective unit cost of each product follows by multiplying the unit cost of the GP of GPs number of each product. By product obtained quantities manufactured cost during a period determined total costs per item (excluding materials). Cost effective product quantity is determined as follows: calculate the aggregate costs per product (also called processing costs) by total cost of raw materials. (D. Catu - 1998)

3. Case study on the use of the method Georges Perrin

It is considered an industrial company profile executing three products A, B, C, whose manufacturing technology require four operations. Operations will join a list of the following operations to be specified for each product number of hours completed at the respective operation

Operations	Number of hours in products and operations		
	A	B	C
01	60	80	85
02	60	100	90
03	-	80	60
04	50	70	-

- physical quantity of production obtained: Q_A =10.000 buc, Q_B=20.000 buc, Q_C=15.000 buc,
- Material costs on products: A = 25.000 lei , B= 45.000 lei , C= 30.000 lei.
- processing expenses in the amount of 70.000 lei which of 54.532,5 lei, expenses imputable
- consisting of: the workmanship 23.000 lei , salary contributions 7.532.50 lei, energy costs 15.000 lei, depreciation of tangible assets 9.000 lei
- The criteria for allocation of costs imputable:

Nr.crt.	Items spending	Criteria for assigning costs imputabile
1.	Salaries and related contributing	Number of working hours equipment
2.	Expenses electricity	Power consumption
3.	Depreciation of tangible assets.	Surface sections in which are equipment.

- Basis of allocation:

Operations	No.equipment working hours	consumption electricity (KW/h)	Surface sections (m^2)
01	100	18.000	100
02	150	29.000	180
03	110	13.000	130
04	100	15.000	90

Stage I: Work establishing GP

1. *Establishing the list of technological operations*
2. *Allocation of imputable costs of the operations*

2.1 Allocation of costs associated with the workmanship and contributions as a criterion for choosing allocating of equipment operating hours.

- Allocating coefficient $K_1 = \frac{23.000+7.352,5}{100+150+110+100} = 66,375$

- Expenses quotas on each operation C_{01} = 100 x 66,375 = 6.637,50
  C_{02} = 150 x 66,375 = 9.956,25
  C_{03} = 110 x 66,375 = 7.301,25
  C_{04} = 100 x 66,375 = 6.637,5
  Total 30.532, 50

2.2. Distribution costs as a criterion for choosing electricity allocating the electricity consumption.

- Allocating coefficient $K_2 = \frac{15.000}{75} = 200$

- Expenses quotas on each operation C_{01} = 18 x 200 = 3.600
  C_{02} = 29 x 200 = 5.800
  C_{03} = 13 x 200 = 2.600
  C_{04} = 15 x 200 = 3.000

2.3. Allocation of depreciation of tangible assets as a criterion for choosing the base surface sections are placed equipment.

- allocating coefficient $K_3 = \frac{9.000}{500} = 18$

- Expenses quotas on each operation C_{01} = 100 x 18 = 1.800
  C_{02} = 180 x 18 = 3.240
  C_{03} = 130 x 18 = 2.340
  C_{04} = 90 x 18 = 1.620
  Total 9.000

- Costs not imputable = Total cost processing – Costs imputable = 70.000 – 54.532,50 = 15.467,5 lei
- The total cost of processing = Total cost of production - Value of materials
- The total cost of processing = Total cost of production - Value of materials
  = 70.000 + 100.000 = 170.000 lei
  The table expenses imputable the operations distributed

Name cost imputable	Operating cost			
	01	02	03	04
Workmanship and contributions	6.637,5	9.956,25	7.301,25	6.637,5
Electricity	3.600	5.800	2.600	3.000
Depreciation of tangible assets	1.800	3.240	2.340	1.620
Total	12.037,5	18.996,25	12.241,25	11.257,5

2. *Choice of standard product*

Product B is chosen as the flagship product, is the most representative. In your choice pay attention to the fact that they cover all operations.

3. *Based index for the standard product. Index base is itself GP will serve to balance production.*

$$I_b = \sum_{i=1}^{n} \frac{COpi}{qpi}$$

where : I_b = Basic index,
C_{opi} = cost of an operation i ,
q_i = Hourly production quantity obtained of an operation.

$$I_b = \frac{C1}{q1} + \frac{C2}{q2} + \frac{C3}{q3} + \frac{C4}{q4} = \frac{12.0357,5}{80} + \frac{18.996,25}{100} + \frac{12.241,25}{80} + \frac{11.257,5}{70} = 654,26829$$

4. *Index equivalent to each operation,GPs to each individual operation.*

$$GP_{op1} = \frac{Cop1}{Ib} = \frac{12.0357,50}{654,26829} = 18,38415 \quad GP_{op2} = \frac{Cop2}{Ib} = \frac{18.996,25}{654,26829} = 29,03434$$

$$GP_{op3} = \frac{Cop3}{Ib} = \frac{12.241,25}{654.26829} = 18,70832 \quad Gp_{op4} = \frac{Cop4}{Ib} = \frac{11.275,50}{654.26829} = 17,206244$$

5. *Index equivalent to each product,GPs to each individual product.*

$$GP_{pr} = \sum_{i=1}^{n} \frac{GPopi}{qopi}$$ where : GP_{pr} = GP-ul on product

i = technological operations.

$$GP_A = \frac{GPop1}{qop1} + \frac{GPop2}{qop2} + \frac{GPop4}{qop4} = \frac{18,398415}{60} + \frac{29,034343}{60} + \frac{17,206244}{50} = 1,1346707$$

$$GP_B = \frac{GPop1}{qop1} + \frac{GPop2}{qop2} + \frac{GPop3}{qop3} + \frac{GPop4}{qop4} = \frac{18,398415}{80} + \frac{29,034343}{100} + \frac{18,70832}{80} + \frac{17,206244}{70} =$$

0,99999998

$$GP_C = \frac{GPop1}{qop1} + \frac{GPop2}{qop2} + \frac{GPop3}{qop3} = \frac{18,38415}{85} + \frac{29,034343}{90} + \frac{18,70832}{60} = 0,8508862$$

Step II: Works determining the costs

1. *Transforming production achieved during the month expressed in natural units GPs - s (equivalent units).*

$q_{ej} = q_j + GP_{pr}$ where : q_j = physical quantity of the product
GP_{pr} = GP product
q_{ej} = equivalent production in GPs
i = like product.

$q_{eA} = q_A \times GP_A$ = 10.000 x 1.1346707 = 11.346,707
$q_{eB} = q_B \times GP_B$ = 20.000 x 0,99999 = 19.999,998
$q_{eC} = q_C \times GP_C$ = 15.000 x 0,8508862 = 12.763,293

2. *Establishing a unit cost GP*

$$C_{uGP} = \frac{\text{Total costs (imputable+not imputable)}}{\text{The unit productions in GPs}} = \frac{70.000}{44.109,996} = 1,5869418$$

3. *Determining the unit cost of production proceses (j)*

$C_{uprj} = C_{uGP} \times GP_{pr}$
$C_{uprA} = 1,5869418 \times 1,1346707 = 1,8006563$
$C_{uprB} = 1,5869418 \times 0,99999998 = 1,5869414$
$C_{uprC} = 1,5869418 \times 0,8508862 = 1,3503068$

4. *Determining the unit cost of production proceses (j)*

$C_{uj} = C_{uprj} + C_{muj}$, where: C_{muj} = material costs per unit of product

$C_{muA} = \frac{25.000}{10.000} = 2,5$ lei/ u.m $\quad$ $C_{muB} = \frac{45.000}{20.000} = 2,25$ lei.u.m $\quad$ $C_{muC} = \frac{30.000}{15.000} = 2$ lei/u.m

$C_{uA} = 1,8006563 + 2,5 = 4,30065$ lei/u.m
$C_{uB} = 1,5860414 + 2,25 = 3,83694$ lei/u.m
$C_{uC} = 1,3503068 + 2 = 3,3503$ lei/u.m

4. Conclusions

We conclude that obtaining actual cost can be improved by using Georges Perrin method because of the advantages it offers when there are specific conditions for its application. It is also helpful to understand the factors that influence the calculation of the actual differences and how these factors act in order to expand the use of the method Georges Perrin.

Among the advantages of the method G. P. may be mentioned:

● provides a real calculation product cost allocation using criteria based on causality costs;

● considerably reduce the workload of track of expenses processing is not be done analytically sectors or centers Expenses and Expenses and cost carriers ,But only synthetic or global enterprise, which is distributed products, works or services to end management periods using GPs-s

● allows for a longer period of time GPs sites, which removes repetition from time to calculate their work;

● identifies the most profitable products, it those that provide cost recovery distributed via GPs sites and not the total cost, fabrication directing them;

● determines the use of production capacity, deviations from planned cost and actual return at the end of product by comparing the number of GPs associated with the production of manufactured products expected.

Of limitations in G. P. can enumerate:

● large volume of work required to establish GPs sites that require a thorough analysis of the company by qualified and experienced;

● difficulties in determining the cost of finished products to the units with large variations from one period to another;

● global track processing expenses and responsibilities does not allow tracking of these expenses operative.

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