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Aspects of the Mounting Problems in the Construction Works

Ion Nae, Niculae Grigore

Universitatea Petrol-Gaze din Ploiești, Bd. București 39, Ploiești e-mail: inae@upg-ploiesti.ro

Abstract

Technological process of assembly is part of the production process by which finished parts are grouped in a logical sequence, in parts, assemblies and units. In these conditions, the paper presents an analysis of the technological process of mounting a speed reducer, using the product Microsoft Project information.

Key words: assembly, lots of parts, geared, logical sequence assembly.

Requirements, Criteria, Objectives

Manufacturing process is part of the production process components during which all transformations are performed material changes in a logical sequence, gradually, in order to obtain a product.

Manufacturing process of mounting assembly presents the ultimate objective (group) finished parts in a logical sequence, in parts, assemblies and units to meet the requirements prescribed by normative quality (fig. 1) [1].

The project also represents a set of new activities, joint specific, structured methods that aim to achieve an objective specified in a period of time with a limited budget.

In general, the project is presented as a plan of action (fig. 2) [3].

All activities are included in the project plan is presented as a hierarchical structure, tree, highlighting the position of activities within their wider groups.

Thus, similarity provided by the two models presented (fig. 1 and fig. 2), the paper analyzes the process of mounting a speed reducer.

Working Model Developed

For installation works that apply speed gear was used tree decomposition component activities. This method allows hierarchical approach to structure the activities needed to conduct the temporal ordering of assembly work. The basic components of an activity are:

- o description / name of activity, namely the establishment of its code;
- o determining the duration of activity (minutes, hours, days, weeks, months etc.);
- o determining resources (human, material, equipment) involved;

o determining the associated costs.

Of the existing planning techniques in project management to use Gantt chart or graph type bar which is based on Microsoft Project product information.

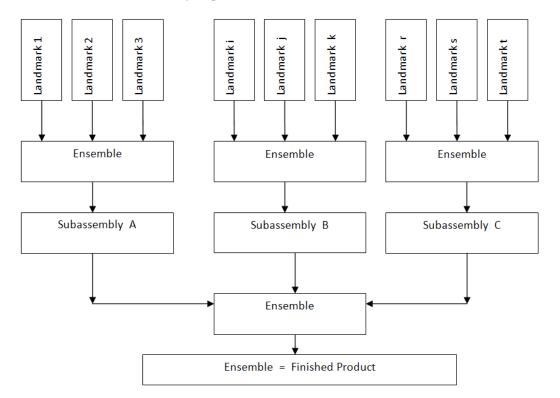


Fig. 1. The structure of the technological process of assembly

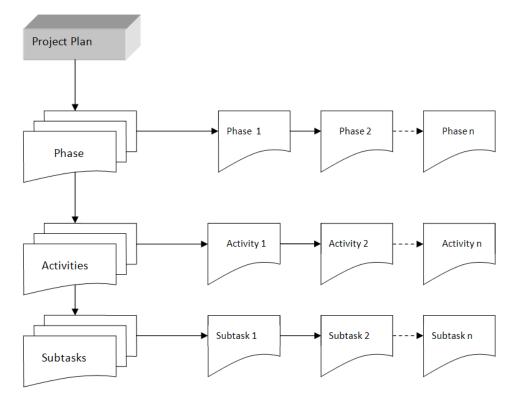


Fig. 2. Project plan

Developing the working model for assembly work gear speed which apply in the construction includes the following steps [2]:

- identify the type of construction of speed gearbox (with one step, two steps, three steps etc. see fig. 3);
- o setting assembly works nomenclature (Table 1);
- determining typical processes (assembly of the modules), establish the necessary resources (human, material, equipment etc. - Table 2);
- establishing the methodology of calculation of technical rules for the installation, the costs of mounting works;
- o setting up additional work related operations (adjustments, rework etc.).

Use of Microsoft Project as a method of information management and monitoring of technological process of assembly speed gear allows:

- establishing the work plan for installation (assembly works nomenclature) establishing the duration of activities;
- o establishing correlations between the activities carried out (entry predecessors);
- o determining the duration of the works of mounting modules (activity summary);
- determining the total length of the technological process of assembly Gantt chart view, establish critical path;
- establishing the necessary resources works assembling resources to activities, resource loading view, calculating the cost of installation of the technological process;
- corrected by changing resource loads overlapping timeframes manual tasks, allocation levels and availability of resources.

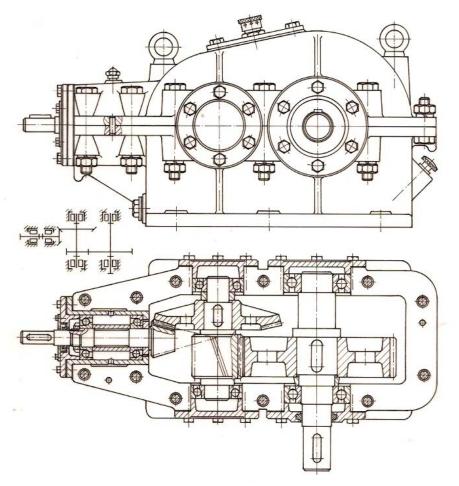


Fig. 3. Geared in two steps

| Crt. No. | Activity Code | Code subtasks | Name of activity | Duration <i>t</i> |
|-------------|------------------|------------------|--|-------------------|
| | | | | (min) |
| 1. | А | I Mounting | shaft (input shaft) | 52 |
| 2. | | A.1. | Thrust bearing assembly in the box | 10 |
| 3. | | A.2. | Mounting spacer ring in box | 3 |
| 4. | | A.3. | Angular bearing assembly in the box | 12 |
| 5. | | A.4. | Conical shaft assembly | 15 |
| 6. | | A.5. | Mounting nut crenellated | 4 |
| 7. | | A.6. | Mounting gasket is tan jar is in the front cover | 3 |
| 8. | | A.7. | Mounting the front cover | 5 |
| 9. | В | Mounting s | haft II (intermediate shaft) | 35 |
| 10. | | B.l. | Longitudinal wedge assembly into place the tree | 4 |
| 11. | | B.2. | Bevel wheel assembly | 8 |
| 12. | | B.3. | Mounting spacer ring | 3 |
| 13. | | B.4. | Bearing assembly I | 10 |
| 14. | | B.5. | Bearing Assembly II | 10 |
| 15. | С | Assembly t | ree III (output shaft) | 35 |
| 16. | | C.1. | Longitudinal wedge assembly into place the tree | 4 |
| 17. | | C.2. | Cylindrical driven gear assembly | 8 |
| 18. | | C.3. | Mounting spacer ring | 3 |
| 19. | | C.4. | Bearing assembly I | 10 |
| 20. | | C.5. | Bearing Assembly II | 10 |
| 21. | D | I in body po | ositioning shaft housing assembly | 18 |
| 22. | F | II in body p | ositioning shaft housing assembly | 20 |
| 23. | G | III in body | positioning shaft housing assembly | 25 |
| 24. | Н | Positioning | the lid over the body-shell case | 15 |
| 25. | Ι | Screws tigh | tening grip body-cover case | 10 |
| 26. | J | Mounting s | haft front covers I | 12 |
| 27. | K | II covers fr | ont shaft assembly | 12 |
| 28. | L | III covers the | he front shaft assembly | 12 |
| 29. | М | Mounting 1 | id Enterprise | 15 |
| 30. | N | Raising the | e cover mounting screws Enterprise | 8 |
| 31. | 0 | Installation | of vent plugs | 5 |
| 32. | Р | Mounting s | crews lifting | 5 |
| 33. | R | Dipstick as | sembly | 11 |
| 34. | S | Verification | n oil level | 3 |

Table 1. Establishing nomenclature assembly works.

| ID | Resource name | Туре | Group | Max. Units | Standard Rate | Accrue At |
|----|-----------------------|------|-----------|------------|---------------|-----------|
| 1. | Team leader | work | technical | 100% | 15 lei / h | prorated |
| 2. | Mechanical locksmith | work | technical | 100% | 151ei / h | prorated |
| 3. | Locksmith fitter | work | technical | 100% | 15 lei / h | prorated |
| 4. | A mechanical operator | work | technical | 100% | 10 lei / h | prorated |
| 5. | Operator Mechanical 2 | work | technical | 100% | 8 1ei / h | prorated |
| 6. | Mechanical Operator 3 | work | technical | 100% | 5 lei / h | prorated |
| 7. | Mechanical Operator 4 | work | technical | 100% | 7 1ei / h | prorated |
| 8. | Operator mechanic 5 | work | technical | 100% | 7 lei / h | prorated |

Table 2. Resources

Method of Installation of a Technological Process Geared

In order to determine how Microsoft Project can be used in the management, tracking optimization of technological process of assembly, following are the stages of work.

- 1. Establishing nomenclature assembly works. According to data presented in Table 1, the process of assembly is structured in three phase's summary (Fig. 4).
- 2. The introduction of time needed to perform assembly work (Fig. 4). To measure the working method were used to direct supervision countdown and assembly works. The results are presented in Table 1.
- 3. Establishing correlations between works (activities) that deployment time in the process of assembly technology. In the technological process of assembly activities succeed in a certain order, some are pampered hatred series an activity can not be started until the other has not been completed, others are pampered hatred in parallel that is the same time (that may overlap completely or partially for example the supply of raw materials and materials § assembly work). For a complex technological process, the complete set of activities necessary to fulfill its activities will include a combination of serial and parallel §, forming a network that can be represented graphically figure 5.
- 4. Determination of total project duration (fig. 6). All the works (activities) assembly linked by logical chronological relationships form a network (a chart / graph or a graph network). Determine the total length of the technological process is shown in figure 6.
- 5. Establishing the critical path of activities for the reserves who are not on the critical path fig. 7. The critical path is the sequence of activities that form an uninterrupted (continuous path) between the beginning and end of the technological process. He is way longer eel (the length) of the entire process. Any delay on critical path activities will automatically lead to a delay of the technological process.
- 6. Establishing the necessary resources. In Microsoft Project, entering information about resources (fig. 8) requires the establishment and operation execution time spent on the cost.
- 7. Allocating resources to activities (fig. 9). How it is managed during a resource allocation over the program is called allocation and can be:
 - o sub-assignment: maximum capacity of resource allocation resource is busy;
 - o allocation entirely: the maximum capacity of resource allocation is occupied;
 - o over-allocation: The maximum capacity is exceeded resource allocation.

In Microsoft Project resource capacity to work is measured in units. Units are measured both in numbers (eg 3 units), and percentage (eg 300% units).

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| | | | |
| | | | |
| | | | |
| | | 🙃 Task Name 🗸 🗸 | Duration 🧹 |
| | 1 | ☐ Mounting shaft (input shaft) | 49 mins |
| Calendar | 2 | Thrust bearing assembly in the box | 10 mins |
| | 3 | Mounting spacer ring in box | 3 mins |
| | 4 | Angular bearing assembly in the box | 12 mins |
| Detail | 5 | Conical shaft assembly | 15 mins |
| Gantt | 6 | Mounting nut crenellated | 4 mins |
| | 7 | Mounting gasket is tan jar is in the front cover | 3 mins |
| | 8 | Mounting the front cover | 5 mins |
| Gantt | 9 | Mounting shaft II (intermediate shaft) | 35 mins |
| Chart | 10 | Longitudinal wedge assembly into place the tree | 4 mins |
| 명 | 11 | Bevel wheel assembly | 8 mins |
| | 12 | Mounting spacer ring | 3 mins |
| Network | 13 | Bearing assembly I | 10 mins |
| Diagram | 14 | Bearing Assembly II | 10 mins |
| | 15 | Assembly tree III (output shaft) | 35 mins |
| | 16 | Longitudinal wedge assembly into place the tree | 4 mins |
| Task Form | 17 | Cylindrical driven gear assembly | 8 mins |
| | 18 | Mounting spacer ring | 3 mins |
| | 19 | Bearing assembly I | 10 mins |
| Task Usage | 20 | Bearing Assembly II | 10 mins |
| | 21 | I in body positioning shaft housing assembly | 18 mins |
| | 22 | II in body positioning shaft housing assembly | 20 mins |
| Timeline | 23 | III in body positioning shaft housing assembly | 25 mins |
| | 24 | Positioning the lid over the body-shell case | 15 mins |
| | 25 | Screws tightening grip body-cover case | 10 mins |
| Tracking | 26 | Mounting shaft front covers I | 12 mins |
| Gantt | 27 | II covers front shaft assembly | 12 mins |
| ulle | 28 | III covers the front shaft assembly | 12 mins |
| | 29 | Mounting lid Enterprise | 15 mins |
| Resource Graph | 30 | Raising the cover mounting screws Enterprise | 8 mins |
| | 31 | Installation of vent plugs | 5 mins |
| ø | 32 | Mounting screws lifting | 5 mins |
| Resource | 33 | Dipstick assembly | 11 mins |
| Sheet | 34 | Verification oil level | 3 mins |

Fig. 4. Structuring the technological process of mounting steps and phases of work

| He Eile | <u>E</u> dit <u>V</u> ie | w <u>I</u> nsert F <u>o</u> rmat <u>T</u> ools <u>P</u> ro | ject <u>R</u> epo | rt <u>C</u> ollaborate | e <u>W</u> indow | Help |
|----------------------|----------------------------|---|----------------------------|--|--|--|
| i 🗅 💕 🖡 | 3 🏟 | 💁 🖤 🔏 🗈 🖺 🝼 I 🄊 🗸 | (* - 1 😣 | eo 🐇 💥 | 🖹 📃 🚰 | 🥵 🛛 No Group 💿 🚽 🍕 🌏 😿 |
| ं सा सा ह | - | 3 4 1 . | | | | |
| | | | | | | |
| | | | | - | | |
| ******* | - I | Task Name | Duration | Start | Finish | Predec5 6 7 8 9 10 11 12 13 14 |
| | 1 | 🖃 Mounting shaft (input s | 49 mins | Fri 08.07.11 | Fri 08.07.11 | |
| Calendar | 2 | Thrust bearing assem | 10 mins | Fri 08.07.11 | Fri 08.07.11 | |
| | 3 | Mounting spacer ring i | 3 mins | Fri 08.07.11 | Fri 08.07.11 | |
| | 4 | Angular bearing asser | 12 mins | Fri 08.07.11 | Fri 08.07.11 | 2 |
| Gantt | 5 | Conical shaft assembl | 15 mins | Fri 08.07.11 | Fri 08.07.11 | 4 |
| Chart | 6 | Mounting nut crenellat | 4 mins | Fri 08.07.11 | Fri 08.07.11 | 5 |
| -8 | 7 | Mounting gasket is tar | 3 mins | Fri 08.07.11 | Fri 08.07.11 | 6 |
| | 8 | Mounting the front cov | 5 mins | Fri 08.07.11 | Fri 08.07.11 | 7 |
| Network | 9 | Mounting shaft II (interi | 35 mins | Fri 08.07.11 | Fri 08.07.11 | |
| Diagram | 10 | Longitudinal wedge as | 4 mins | Fri 08.07.11 | Fri 08.07.11 | |
| | 11 | Bevel wheel assembly | 8 mins | Fri 08.07.11 | Fri 08.07.11 | 10 |
| | 12 | Mounting spacer ring | 3 mins | Fri 08.07.11 | Fri 08.07.11 | 11 |
| Task Usage | 13 | Bearing assembly I | 10 mins | Fri 08.07.11 | Fri 08.07.11 | 12 |
| | 14 | Bearing Assembly II | 10 mins | Fri 08.07.11 | Fri 08.07.11 | 13 |
| | 15 | 🖃 Assembly tree III (outp | 35 mins | Fri 08.07.11 | Fri 08.07.11 | |
| Tracking | 16 | Longitudinal wedge a: | 4 mins | Fri 08.07.11 | Fri 08.07.11 | 14 |
| Gantt | 17 | Cylindrical driven gear | 8 mins | Fri 08.07.11 | Fri 08.07.11 | 16 |
| ulks | 18 | Mounting spacer ring | 3 mins | Fri 08.07.11 | Fri 08.07.11 | 17 |
| | 19 | Bearing assembly I | 10 mins | Fri 08.07.11 | Fri 08.07.11 | 18 |
| Resource Graph | 20 | Bearing Assembly II | 10 mins | Fri 08.07.11 | Fri 08.07.11 | 19 |
| Groph | 21 | I in body positioning shaft I | 18 mins | Fri 08.07.11 | Fri 08.07.11 | 20 |
| | 22 | II in body positioning shaft | 20 mins | Fri 08.07.11 | Fri 08.07.11 | 21 |
| | 23 | III in body positioning shaft | 25 mins | Fri 08.07.11 | Fri 08.07.11 | 22 |
| Resource Sheet | 24 | Positioning the lid over the | 15 mins | Fri 08.07.11 | Fri 08.07.11 | 23 |
| | 25 | Screws tightening grip boo | 10 mins | Fri 08.07.11 | Fri 08.07.11 | 24 |
| 4 | 26 | Mounting shaft front cover | 12 mins | Fri 08.07.11 | Fri 08.07.11 | 25 |
| | 27 | Il covers front shaft asser | 12 mins | Fri 08.07.11 | Fri 08.07.11 | 10 11 12 13 14 16 17 18 19 20 21 22 23 24 25 26 27 |
| Resource | 28 | III covers the front shaft as | 12 mins | Fri 08.07.11 | Fri 08.07.11 | 27 🦲 |
| Resource Usage | | | | | E 1 00 0E 11 | |
| | 29 | Mounting lid Enterprise | 15 mins | Fri 08.07.11 | Fri 08.07.11 | |
| | 29 30 | | 15 mins 8 mins | Fri 08.07.11 Fri 08.07.11 | Fri 08.07.11 Fri 08.07.11 | 28 |
| Usage | 29 | Mounting lid Enterprise | | | | 28 29 |
| Usage | 29 30 31 32 | Mounting lid Enterprise Raising the cover mountin | 8 mins | Fri 08.07.11 | Fri 08.07.11 | 28 29 30 |
| Usage III More | 29 30 31 32 33 | Mounting lid Enterprise Raising the cover mountin Installation of vent plugs | 8 mins 5 mins | Fri 08.07.11 Fri 08.07.11 | Fri 08.07.11 Fri 08.07.11 | 28 29 30 31 |
| Usage III More | 29 30 31 32 | Mounting lid Enterprise Raising the cover mountin Installation of vent plugs Mounting screws lifting | 8 mins 5 mins 5 mins | Fri 08.07.11 Fri 08.07.11 Fri 08.07.11 | Fri 08.07.11 Fri 08.07.11 Fri 08.07.11 | 28 29 30 31 32 |

Fig. 5. Gantt chart view

| Current Fri 7/8/11 Baseline NA | Fri 7/8/11 |
|--|------------|
| | |
| | NA |
| Actual NA | NA |
| Variance Om | Om |
| Duration Work | Cost |
| Current 290m Om | 0.00 lei |
| Baseline Om Om | 0.00 lei |
| Actual Om Om | 0.00 lei |
| Remaining 290m Om | 0.00 lei |

Fig. 6. Determine the total length of the technological process

| | i | Task Name 💂 | Leveling 🖕 Delay | Duration 🖕 | Start 🚽 | Finish 🖕 | Succes Fri Jul 8 7 8 9 10 11 12 1 2 | 3 4 |
|----|---|-------------------------------|---------------------|------------|------------|------------|---|---------|
| 1 | | Mounting shaft (input s | 0 emins | 49 mins | Fri 7/8/11 | Fri 7/8/11 | 44 | |
| 2 | | Thrust bearing assembl | 0 emins | 10 mins | Fri 7/8/11 | Fri 7/8/11 | 3,4 | |
| 3 | | Mounting spacer ring in | 0 emins | 3 mins | Fri 7/8/11 | Fri 7/8/11 | 2 | 77 mins |
| 4 | | Angular bearing assem | 0 emins | 12 mins | Fri 7/8/11 | Fri 7/8/11 | 5 1 | |
| 5 | | Conical shaft assembly | 0 emins | 15 mins | Fri 7/8/11 | Fri 7/8/11 | | |
| 6 | | Mounting nut crenellate | 0 emins | 4 mins | Fri 7/8/11 | Fri 7/8/11 | 7 | |
| 7 | | Mounting gasket is tan j | 0 emins | 3 mins | Fri 7/8/11 | Fri 7/8/11 | 8 | |
| 8 | | Mounting the front cove | 0 emins | 5 mins | Fri 7/8/11 | Fri 7/8/11 | 10 | |
| 9 | | Mounting shaft II (interr | 0 emins | 35 mins | Fri 7/8/11 | Fri 7/8/11 | • | |
| 10 | | Longitudinal wedge as: | 0 emins | 4 mins | Fri 7/8/11 | Fri 7/8/11 | 11 🦷 | |
| 11 | | Bevel wheel assembly | 0 emins | 8 mins | Fri 7/8/11 | Fri 7/8/11 | 12 | |
| 12 | | Mounting spacer ring | 0 emins | 3 mins | Fri 7/8/11 | Fri 7/8/11 | 13 | |
| 13 | | Bearing assembly I | 0 emins | 10 mins | Fri 7/8/11 | Fri 7/8/11 | 14 | |
| 14 | | Bearing Assembly II | 0 emins | 10 mins | Fri 7/8/11 | Fri 7/8/11 | 16 | |
| 15 | | Assembly tree III (outp | 0 emins | 35 mins | Fri 7/8/11 | Fri 7/8/11 | • | |
| 16 | | Longitudinal wedge as: | 0 emins | 4 mins | Fri 7/8/11 | Fri 7/8/11 | 17 | |
| 17 | | Cylindrical driven gear (| 0 emins | 8 mins | Fri 7/8/11 | Fri 7/8/11 | 18 | |
| 18 | | Mounting spacer ring | 0 emins | 3 mins | Fri 7/8/11 | Fri 7/8/11 | 19 | |
| 19 | | Bearing assembly I | 0 emins | 10 mins | Fri 7/8/11 | Fri 7/8/11 | 20 | |
| 20 | | Bearing Assembly II | 0 emins | 10 mins | Fri 7/8/11 | Fri 7/8/11 | 21 | |
| 21 | | I in body positioning shaft I | 0 emins | 18 mins | Fri 7/8/11 | Fri 7/8/11 | 22 🧴 | |
| 22 | | I in body positioning shaft | 0 emins | 20 mins | Fri 7/8/11 | Fri 7/8/11 | 23 | |
| 23 | | III in body positioning shaft | 0 emins | 25 mins | Fri 7/8/11 | Fri 7/8/11 | 24 | |
| 24 | | Positioning the lid over the | 0 emins | 15 mins | Fri 7/8/11 | Fri 7/8/11 | 25 | |
| 25 | | Screws tightening grip boc | 0 emins | 10 mins | Fri 7/8/11 | Fri 7/8/11 | 26 | |
| 26 | | Mounting shaft front cover | 0 emins | 12 mins | Fri 7/8/11 | Fri 7/8/11 | 27 | |
| 27 | | I covers front shaft assem | 0 emins | 12 mins | Fri 7/8/11 | Fri 7/8/11 | 28 | |
| 28 | | III covers the front shaft as | 0 emins | 12 mins | Fri 7/8/11 | Fri 7/8/11 | 11 12 13 14 16 17 18 19 20 21 22 23 24 25 26 27 28 29 | |
| 29 | | Mounting lid Enterprise | 0 emins | 15 mins | Fri 7/8/11 | Fri 7/8/11 | 30 | |
| 30 | | Raising the cover mountin | 0 emins | 8 mins | Fri 7/8/11 | Fri 7/8/11 | 31 | |
| 31 | | Installation of vent plugs | 0 emins | 5 mins | Fri 7/8/11 | Fri 7/8/11 | 32 | |
| 32 | | Mounting screws lifting | 0 emins | 5 mins | Fri 7/8/11 | Fri 7/8/11 | 33 | |
| 33 | | Dipstick assembly | 0 emins | 11 mins | Fri 7/8/11 | Fri 7/8/11 | 29 30 31 32 33 34 | |
| 34 | | Verification oil level | 0 emins | 3 mins | Fri 7/8/11 | Fri 7/8/11 | † | |

Fig. 7. Identify the critical path

| | 6 | Resource Name 🔹 🔻 | Туре | • N | lax. 💌 | Std. Rate 🔹 💌 | Ovt. Rate 💌 | Cost/Use 🔻 | Accrue 💌 | Base 💌 |
|---|---|--------------------------|------|-----|--------|---------------|-------------|------------|----------|----------|
| 1 | | | | | | | | | | |
| 2 | | Team leader | Work | | 100% | 15.00 lei/hr | 0.00 lei/hr | 0.00 lei | Prorated | Standard |
| 3 | | Mechanical locksmith | Work | | 100% | 15.00 lei/hr | 0.00 lei/hr | 0.00 lei | Prorated | Standard |
| 4 | | Locksmith fitter | Work | | 100% | 15.00 lei/hr | 0.00 lei/hr | 0.00 lei | Prorated | Standard |
| 5 | | A mechanical operator | Work | | 100% | 10.00 lei/hr | 0.00 lei/hr | 0.00 lei | Prorated | Standard |
| 6 | | Operator Mechanical 2 | Work | | 100% | 8.00 lei/hr | 0.00 lei/hr | 0.00 lei | Prorated | Standard |
| 7 | | Mechanical Operator 3 | Work | | 100% | 5.00 lei/hr | 0.00 lei/hr | 0.00 lei | Prorated | Standard |
| 8 | | Mechanical Operator 4 | Work | | 100% | 7.00 lei/hr | 0.00 lei/hr | 0.00 lei | Prorated | Standard |
| 9 | | Operator mechanic 5 | Work | | 100% | 7.00 lei/hr | 0.00 lei/hr | 0.00 lei | Prorated | Standard |

Fig. 8. Establishing the necessary resources

| | 6 | Task Name 🖕 | Duration 🚽 | Sat Jul 9 |
|--------|---|---|--------------------|---|
| 1 | • | Mounting shaft (input s | 49 mins | 3 4 5 6 7 8 9 10 11 12 1 2 3 4 5 6 7 8 9 10 11 12 1 1 2 3 4 5 6 7 8 9 10 11 12 1 2 3 4 5 6 7 8 9 10 11 12 1 |
| 2 | | Thrust bearing assembl | 49 mins 10 mins | Locksmith fitter[50%],Mechanical locksmith[20%] |
| 3 | | - | | A mechanical operator[10%],Locksmith fitter[10%],Mechanical Operator 3[10%] |
| _ | | Mounting spacer ring in | 3 mins | |
| 4 | | Angular bearing assem | 12 mins | Locksmith fitter[50%],Mechanical Operator 4[50%] |
| 5 6 | | Conical shaft assembly | 15 mins | Mechanical locksmith[50%],Operator mechanic 5[50%] |
| | | Mounting nut crenellate | 4 mins | A mechanical operator[10%],Locksmith fitter[50%],Operator mechanic 5[50%] |
| 7 | | Mounting gasket is tan j | 3 mins | A mechanical operator[10%], Mechanical locksmith[50%], Operator Mechanical 2[50%] |
| 8 | | Mounting the front cove | 5 mins | A mechanical operator[50%],Operator mechanic 5[50%] |
| 9 | | Mounting shaft II (interr | 35 mins | |
| 10 | | Longitudinal wedge as: | 4 mins | Operator Mechanical 2[50%],Mechanical Operator 3[50%] |
| 11 | | Bevel wheel assembly | 8 mins | Mechanical locksmith[50%],Operator Mechanical 2[50%] |
| 12 | | Mounting spacer ring | 3 mins | Operator mechanic 5[50%], A mechanical operator[50%] |
| 13 | | Bearing assembly I | 10 mins | Mechanical Operator 3[50%],Locksmith fitter[50%] |
| 14 | | Bearing Assembly II | 10 mins | Operator mechanic 5[50%],Locksmith fitter[50%] |
| 5 | | Assembly tree III (outp | 35 mins | |
| 16 | | Longitudinal wedge as: | 4 mins | Mechanical Operator 4[50%],Locksmith fitter[50%] |
| 7 | | Cylindrical driven gear a | 8 mins | Mechanical Operator 3[50%],Mechanical Operator 4[50%] |
| 18 | | Mounting spacer ring | 3 mins | Locksmith fitter[50%],Operator Mechanical 2[50%] |
| 19 | | Bearing assembly I | 10 mins | Operator Mechanical 2[50%],Locksmith fitter[50%] |
| 20 | | Bearing Assembly II | 10 mins | A mechanical operator[50%],Mechanical Operator 4[50%] |
| 21 | | l in body positioning shaft l | 18 mins | 🕻 Operator mechanic 5[50%],Operator Mechanical 2[50%] |
| 22 | | I in body positioning shaft | 20 mins | Team leader[10%],A mechanical operator[50%],Mechanical Operator 3[50%] |
| 23 | | III in body positioning shaft | 25 mins | Locksmith fitter[10%],A mechanical operator[10%],Mechanical Operator 3[10%] |
| 24 | | Positioning the lid over the | 15 mins | Team leader[10%],Mechanical Operator 3[10%],Operator mechanic 5[10%] |
| 25 | | Screws tightening grip boc | 10 mins | A mechanical operator[10%],Mechanical Operator 3[10%] |
| 26 | | Mounting shaft front cover | 12 mins | Mechanical Operator 3[50%],Operator Mechanical 2[50%] |
| 27 | | I covers front shaft asserr | 12 mins | Locksmith fitter[10%],Operator Mechanical 2[10%] |
| 28 | | III covers the front shaft as | 12 mins | Team leader[10%],Locksmith fitter[50%],Operator mechanic 5[50%] |
| 29 | | Mounting lid Enterprise | 15 mins | Team leader[10%],Mechanical Operator 3[10%],Mechanical Operator 4[10%] |
| 30 | | Raising the cover mountin | 8 mins | Mechanical Operator 3[50%],Mechanical Operator 4[50%] |
| 31 | | Installation of vent plugs | 5 mins | A mechanical operator[50%],Operator Mechanical 2[50%] |
| 32 | | Mounting screws lifting | 5 mins | Mechanical Operator 4[50%],Mechanical locksmith[50%] |
| 33 | | Dipstick assembly | 11 mins | Team leader[10%],Locksmith fitter[10%],Operator Mechanical 2[10%] |
| 34 | | Verification oil level | 3 mins | A mechanical operator[50%],Operator Mechanical 2[50%] |

Fig. 9. View the allocation of resources on activities

8. Determination of total duration, and cost calculation of the technological process of assembly - figure 10.

| | Start | | | Finish |
|--------------------|----------|------------|----------|-----------|
| Current | | Fri 7/8/11 | | Fri 7/8/1 |
| Baseline | | NA | | N |
| Actual | | NA | | N |
| Variance | | Om | | On |
| | Duration | Work | | Cost |
| Current | 290m | | 290m | 47.06 le |
| Baseline | Om | | Om | 0.00 le |
| Actual | Om | | Om | 0.00 le |
| Remaining | 290m | | 290m | 47.06 le |
| Baseline Actual | Om Om | | Om Om | 0.0 |

Fig. 10. Determination of total duration, and cost calculation and technological process of assembly

Conclusions

The ultimate goal of any process or installation is getting a quality product that is characterized by precision dimensional geometric shape precision surfaces and the mutual position.

In this sense, technical progress and the rapid pace of development in Construction Industry conditions require increasingly more demanding. Currently, for correct operation of the bodies, not only constructive and precision dimensional concepts are decisive, but also the quality of the assembly surfaces of these organs.

Usefulness of the proposed method is justified by:

- o systemic approach that allows the assembly works elimination time not worked;
- o composition of models which can be changed quickly by using the computer system;
- fast adaptation to changes that occur in the cycle of assembly (modification of working time, resource replacement, indicating disruptions of work etc.);
- establishment of patterns of large sections of thing works, tracking efficiency, permanent record of work that is done, the rapid control of the working stages, emphasizing activities that do not fit in the specified parameters, rapid analysis of the costs of resources used.

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Aspecte privind problematica lucrărilor de montaj în construcția de mașini

Rezumat

Procesul tehnologic de montaj reprezintă o parte a procesului de producție prin care piesele finite sunt grupate într-o succesiune logică, în subansamble, ansamble, agregate.

În aceste condiții, lucrarea prezintă o modalitate de analiză a procesului tehnologic de montaj a unui reductor de turație, utilizând produsul informatic Microsoft Project.