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PROJECT MANAGEMENT OF Z TRANSPORT CONVEYOR PRODUCT ASSIMILATION PROJECT USING MICROSOFT PROJECT

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Abstract: This paper explores the application of the *Critical Path Method* (CPM) in the development and implementation of a new manufacturing process using *Microsoft Project*. The study analyses the implementation management of a new manufacturing structure, using a case from a car parts manufacturing company in Oradea. The process began with identifying all activities required for the project, followed by establishing the dependency relationships (predecessors) for each activity. The human and material resources necessary for project execution were identified with the assistance of the project manager and technical team, and the associated costs (both fixed and variable) were determined. All data was input into *Microsoft Project* software for analysis. The use of *Microsoft Project* revealed potential issues in project implementation, such as resource shortages, critical activities, and overall implementation time. The application of the software facilitated the optimization of the project by accurately identifying the critical path, reducing execution time, and providing a clear visualization of costs. This paper offers a method for optimizing the design and implementation of a new manufacturing system. The approach assists production managers in altering or implementing new manufacturing structures, tracking progress, and visualizing costs. This method is an effective tool for managing project execution. The paper highlights the advantages of using the critical path method in the modernization and transformation of manufacturing structures through the use of *Microsoft Project*.

Keywords: Critical Path Method, Microsoft Project software, automotive industry, management, manufacturing

1. INTRODUCTION

In the current market economy, the integration of new products represents a significant challenge for any company. The assimilation process must be carried out in the shortest possible time and with minimal costs. Achieving these objectives requires the implementation of highly efficient methodologies and procedures [1].

At the beginning of the 20th century, H.L. Gantt introduced the Gantt Chart, the first production planning tool, and F.W. Taylor established production standards [2]. The development of mathematics and cybernetics enabled the selection of production scheduling methods, while the advent of computers revolutionized the field.

The *Critical Path Method* (CPM) is essential in construction project management [3] [4], with Kerzner [5] and Nicholas & Steyn [6] explaining its application in industrial management to optimize resources and reduce delays. Research paper [7] also suggests using CPM for construction projects and alternative methods for resource-constrained activities. It provides fundamental information required for construction project management and serves as the foundation for analysing the impact of delays on the construction process [8], [9].

The paper [10] proposes a procedure for managing a new product assimilation process, based on CPM and implemented with *Microsoft Project*, showing how identifying critical activities can shorten the assimilation time. Microsoft Project's role in project management is discussed by its developers, illustrating how it aids in CPM application to monitor progress [11].

Research paper [12] highlights the importance of combining project management with innovation and sustainability to meet current societal needs, suggesting the use of system dynamics modelling to support decision-making in project management.

The Z Transport Conveyor is designed to optimize material handling in production and processing environments [13]. Its Z-shaped configuration allows both vertical and horizontal movement, beneficial for food processing and packaging industries [14]. This conveyor system is valued for its ability to save space while maintaining efficient workflow and smooth transportation of goods [15], [16].

The development of the Z Transport Conveyor includes design and engineering, with components selected based on client specifications, followed by fabrication and assembly [17]. The implementation of this complex system integrates mechanical and electrical engineering, using *Microsoft Project* to manage resources and ensure on-time, on-budget delivery [18] [19]. This research paper presents and demonstrates the application of CPM using *Microsoft Project* for managing the design and manufacturing of the Z Transport Conveyor at a custom industrial equipment company in Oradea.

2. DEFINING THE PROCEDURE FOR USING THE CRITICAL PATH IN PROJECT MANAGEMENT

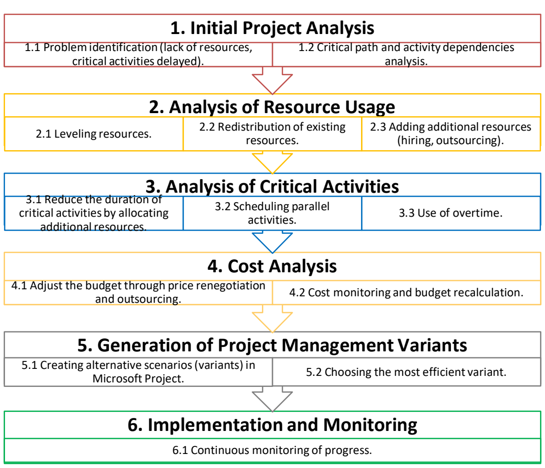

Fig 1. Stages of Project Implementation in *Microsoft Project* using the *Critical Path Method (CPM)*

The application of CPM using *Microsoft Project* follows a defined procedure with six stages, each containing specific steps, as outlined in this my research paper, detailed in Figure 1.

3. PROJECT MANAGEMENT OF Z TRANSPORT CONVEYOR PRODUCT ASSIMILATION

Project management of the Z Transport Conveyor assimilation is crucial to optimize manufacturing, reduce production time, and enhance workflow efficiency. The production space layout (Figure 2) is designed to optimize conveyor positioning, ensuring efficient material flow and minimizing bottlenecks.

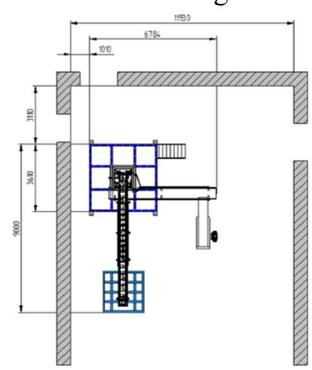

Fig 2. The layout of the production space.

Figure 3 shows the 3D design of the conveyor, highlighting its key structural and functional features. To meet the growing demand for customized industrial equipment, the company has integrated this model to expand capacity and improve efficiency. The Z Transport Conveyor facilitates controlled material movement across different levels of a production line.

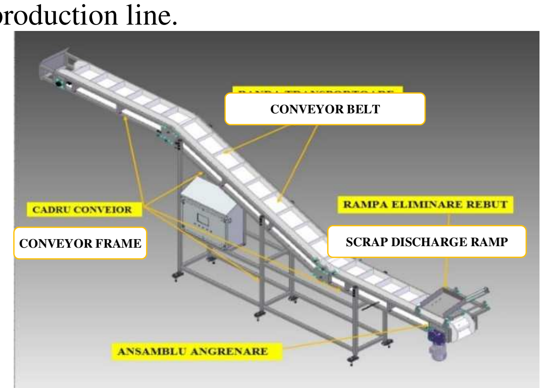

Fig 3. [...]or product in the Design Phase (3D Model)

The next section covers project activities, resource planning, task scheduling, and execution monitoring using *Microsoft Project*. Table 1 outlines the duration, predecessors, and required resources for each activity, with key tasks highlighted. The Z Transport Conveyor assimilation project is managed using *Microsoft Project* and the critical path method. This approach helps identify key activities, enabling project managers to focus on them in order to shorten overall execution time. By reallocating or adding resources to critical tasks, the project duration can be reduced.

Tabel 1

Activities necessary for the realization of the Z-transport conveyor equipment

ID	Task Name	Duration	Predecessors	Resource Names
1	**Project management of Z transport conveyor product assimilation project**	**26.25**		
2	Contract signing	0.5		General Manager, Project Manager
3	**CAD design**	**6**		
4	Welded frame design	2	2	Mechanical Designer
5	Scrap removal ramp design	2	2	Mechanical Designer
6	Lower conveyor frame design	3	2	Mechanical Designer
7	Drive assembly design	2	2	Mechanical Designer
8	Belt design	3	2	Mechanical Designer
9	Project review	2	4,5,6,7,8	Mechanical Designer
10	Realization of TD- procurement	1	4,5,6,7,8,9	Mechanical Designer
11	**Electrical and pneumatic design**	**3**		
12	PLC program development	3	3	PLC Programmer
13	**Material and Equipment Procurement**	3.75		
14	Pipe ordering	0.25	2,3	Supply Worker
15	Delivery Pipe Ordering	1	14	Logistics & Supply Chain
16	Mechanical components ordering	0.25	2,3,14	Supply Worker
17	Delivery Mechanical components ordering	1	16	Logistics & Supply Chain
18	Belt ordering	0.25	2,3,14,16	Supply Worker
19	Delivery Belt ordering	1	18	Logistics & Supply Chain
20	Drive assembly ordering	0.25	2,3,14,16,18	Supply Worker
21	Delivery Drive assembly ordering	1	20	Logistics & Supply Chain
22	Raw material ordering for parts	0.25	2,3,14,16,18,20	Supply Worker
23	Delivery Raw material ordering for parts	2	22	Logistics & Supply Chain
24	Sensors and electrical components ordering	0.25	2,3,14,16,18,20,22	Supply Worker
25	Delivery Sensors and electrical components ordering	2	24	Logistics & Supply Chain
26	PLC ordering	0.25	2,3,14,16,18,20,22, 24	Supply Worker
27	Delivery PLC ordering	2	26	Logistics & Supply Chain
28	**Technological preparation and CNC programming for parts machining**	**4**		
29	Technical documentation analysis	1	3,9	CNC Programmer Engineer, Mechanical Engineer
30	Classical machining technology - welded frame assembly	2	3,29	Mechanical Engineer
31	Classical machining technology - scrap removal system	2	3,29	Mechanical Engineer
32	Classical machining technology - belt turn assembly	2	3,29	Mechanical Engineer
33	CNC parts programs - welded frame assembly	3	4,29,9	CNC Programmer Engineer
34	CNC parts programs - scrap removal system	3	5,29,9	CNC Programmer Engineer
35	CNC parts programs - belt turn assembly	3	6,7,8,9,29	CNC Programmer Engineer
36	Manufacturing and Final Inspection prior to Assembly	4.75		

ID	Task Name	Duration	Predecessors	Resource Names
37	Classical machining - welded frame assembly	1	30,15,23,17	Milling Operator, Turner Operator
38	Classical machining - scrap removal system	1	31,17,23	Milling Operator, Turner Operator
39	Classical machining - belt return assembly	1	35,19,23	Milling Operator, Turner Operator
40	CNC parts machining - welded frame assembly	1	30,33,15,17,23	CNC Operator
41	CNC parts machining - scrap removal system	1	31,34,17,23,40	CNC Operator
42	CNC parts machining - belt return assembly	1	35,39,17,23,41	CNC Operator
43	Final inspection & quality control	1	37,38,39,40,41,42	Mechanical Engineer
44	**Assembly execution**	**2**		
45	Mechanical components assembly	2	36,17,19	Locksmith
46	Pneumatic components assembly	1	36	Locksmith
47	Electrical components assembly	1	25,27,36,24,26,21	Electrical Technician
48	**Testing**	**3**		
49	Testing without product	1	44	Mechanical Engineer, PLC Programmer
50	Testing with product	2	49	Mechanical Engineer, PLC Programmer
51	**Final Technical Documentation**	**4**		
52	Realization of technical documentation	2	10	Mechanical Designer
53	Realization of technical documentation	1	12	PLC Programmer
54	**Delivery**	**2.75**		
55	Packaging and Labeling	0.75	3,48,51	Logistics Supervisor
56	Preparation for transport to customer	1	55	Sales Agent
57	Transport to customer	1	56	Delivery to Customer [1 1]
58	**Endurance testing at the client**	**3**	**54**	Mechanical Engineer, Project Manager
59	**Final handover**	**1**	**58,52,53**	General Manager

The data presented in Table 2 outlines the detailed cost structure for the execution of the Z Transport Conveyor product. It includes the breakdown of material costs, commercial components, and labour cost for both the mechanical and electrical aspects of the project.

Table 2

Conveyor Transport Z Project Cost Overview

Category	Description	Quantity	Unit price (€)	Total cost (€)
Materials (Mechanical)	Food-grade Stainless Steel Pipe 40x20x2	100 kg	7.00	700.00
	Food-grade Stainless Steel Block	125 kg	7.00	875.00
	Polyamide material	20 kg	30.00	600.00
Total Materials				**2,175.00**
Commercial (Mechanical)	Conveyor Belt – M5010 Flat Top 2” - 375mm	1 piece	4,022.00	4,022.00
	Sprocket 2” - M50S1040Q6-N1	6 pieces	23.65	141.90
	Retainer Clamp for 40mm Square Shaft	4 pieces	3.33	13.32
	Extruded Profile for 2.5mm Steel Tape	12 pieces	7.60	91.20
	Stainless Steel Bearing with SKF	2 pieces	62.38	124.76
	Stainless Steel Bearing TUWK 25 LTHR	6 pieces	22.25	133.50
	Industrial Wheel with Brake	10 pieces	15.75	157.50
	Assembly Parts + Other Components	1 set	500.00	500.00
Total Commercial				**5,184.18**
Commercial (Electrical)	Electric Motor for Food-grade Conveyor	1 piece	1,200.00	1,200.00
	Rotary Cylinder	1 piece	450.00	450.00
	Pneumatic Island	1 set	1,000.00	1,000.00
	Laser Sensor	2 pieces	250.00	500.00
	Electric Panel + Electrical Components	1 set	3,500.00	3,500.00
Total Electrical Parts				**6,650.00**

To optimize the implementation process, it was essential to specify both the standard and additional costs of the human resources involved, as well as the expenses for the required equipment. Table 3 present the human resources allocated for the project execution. The table provides a clear overview of the resources and their respective costs. To optimize the implementation process, it was essential to specify both the standard and additional costs of the human resources involved, as well as the expenses for the required equipment.

Table 3

Human Resources for Project Execution

No. crt.	Resource Name	Std. Rate (€/hr)	Ovt. Rate (€/hr)
1	General Manager	16	32
2	Project Manager	12	24
3	Sales Agent	6	12
4	Supply Worker	6	12
5	Logistics Supervisor	3	7
6	Mechanical Designer	10	22
7	CNC Programmer Engineer	10	22
8	PLC Programmer	8	18
9	Mechanical Engineer	12	24
10	Milling Operator	6	12
11	Locksmith	6	12
12	Turner Operator	6	12
13	CNC Operator	7	14
14	Electrical Technician	7	14

4. PROJECT IMPLEMENTATION IN MICROSOFT PROJECT

The project will be implemented using *Microsoft Project*. This software enables a comprehensive analysis of all aspects related to project management, including activity definition, critical path determination, resource allocation, and cost analysis.

Graphical views offer visual representations of project data, with the most commonly used being the Calendar view, Gantt chart, PERT diagram, and resource and cost histograms. The Calendar view presents activities as bars on a timeline, helping users easily identify tasks to be completed within specific timeframes. The Gantt chart, displayed by default in *Microsoft Project*, provides a clear overview of the project, allowing users to focus on activity durations and critical deadlines.

4.1 Initial assessment and identification of issues in project implementation

The first step in evaluating Variant I of this process is to verify the entered information. This includes checking the sequence of activities, the predecessor activities, and, if necessary, updating them, as well as allocating the required human and material resources for each activity. Once this information has been entered and verified, we can observe the essential activities in the project visualization by enabling the *Critical Path view* in the initial project variant, Figure 4.

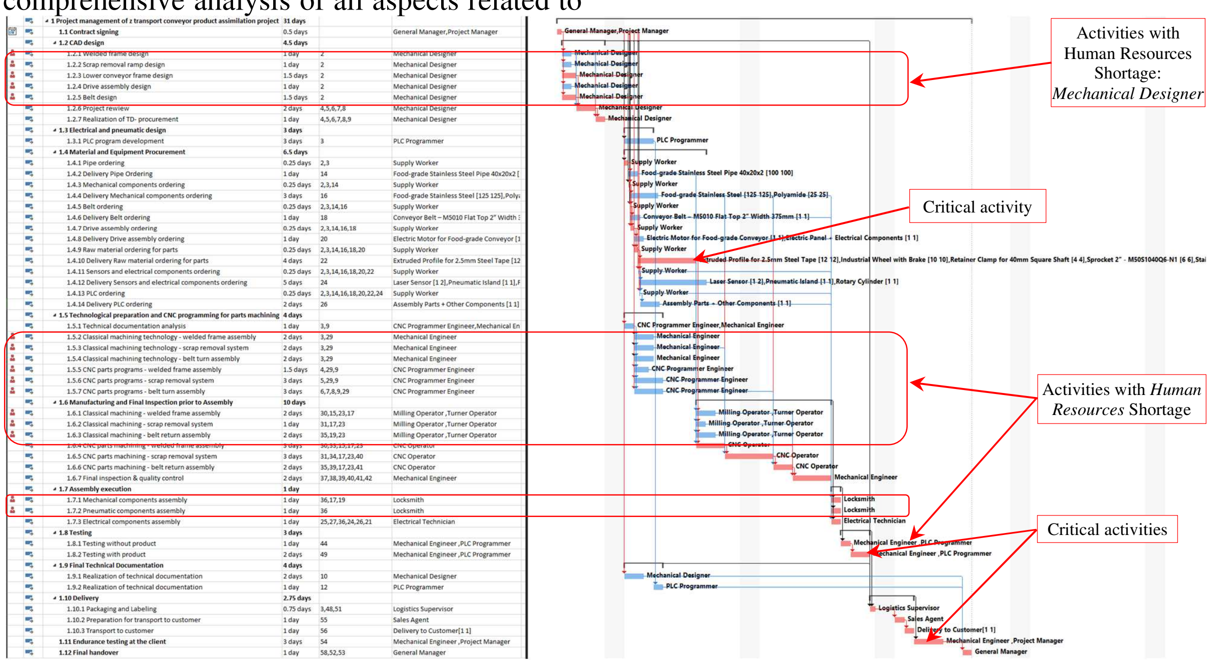

Fig 4. Variant I of project activity scheduling

Additionally, the *Gantt Chart* for this variant reveals a personnel shortage in several activities, such as *Mechanical Designer, Mechanical Engineer, CNC Programmer Engineer, Milling Operator, Turner Operator, and Locksmith.*

	Start	Finish
Current	Mon 2/19/24	Mon 4/1/24
Baseline	NA	NA
Actual	NA	NA
Variance	0d	0d

	Duration	Work	Cost
Current	31d	565h	€19,490.18
Baseline	0d	0h	€0.00
Actual	0d	0h	€0.00
Remaining	31d	565h	€19,490.18

Fig 5. Project characteristics – Variant I

The evaluation of Variant I, Figure 5, stops here due to these factors being not implementable in reality (shortage of human resources).

3.2 Implementation of Variant II of the Project

To manage project resources efficiently, Microsoft Project's *Automatic Resource Leveling* will be used to prevent overloads and ensure balanced allocation. The software automatically identifies the critical path, allowing easy access to key activities. In Variant II, resources for critical tasks (e.g., *Mechanical Designer, Mechanical Engineer, CNC operator*) can be supplemented, as shown in Figure 6. The Gantt chart for this version highlights the overloading of key resources, such as the *Mechanical Designer*, which may cause bottlenecks and delays.

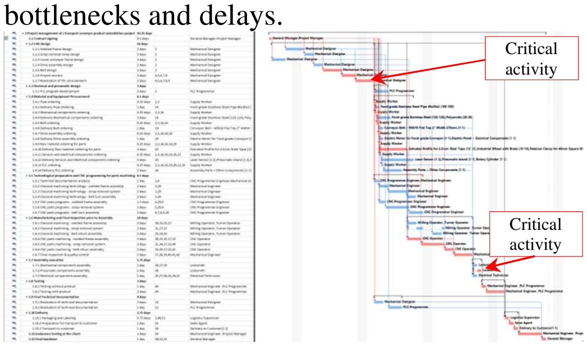

Fig 6. Variant II of project activity scheduling

The dependencies between activities, especially in material and equipment procurement, can cause delays if a key task is postponed. The limited buffer on the *Critical Path* means any deviation can impact the project deadline. Procurement delays, with varying delivery times for components like conveyor belts, bearings, and electrical parts, affect assembly and testing. Additionally, overlaps between production and assembly stages, such as CNC machining delays, can further delay the process. These issues can be managed through optimized resource planning, automatic leveling in *Microsoft Project*, and identifying alternatives for critical tasks. In Variant II (Figure 7), the execution duration is 637 hours over 44 days, with total costs amounting to €20,146.18.

	Start	Finish
Current	Mon 2/19/24	Thu 4/18/24
Baseline	NA	NA
Actual	NA	NA
Variance	0d	0d

	Duration	Work	Cost
Current	43.25d	637h	€20,146.18
Baseline	0d	0h	€0.00
Actual	0d	0h	€0.00
Remaining	43.25d	637h	€20,146.18

Fig 7. Project characteristics – Variant II

The material cost for Variant II is €14,320.18 and the work cost is €5,826.00.

3.3 Implementation of Variant III of the Project

In Variant III, one extra resource was added for both the *Mechanical Designer* and the *CNC operator* to support the critical tasks from Variant II (Figure 6), aiming to improve the process and ensure better management of the project's critical activities (Figure 8).

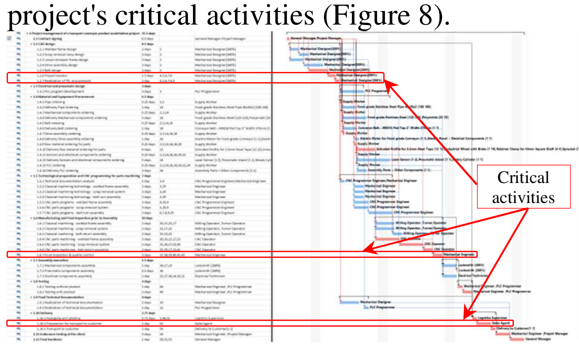

Fig 8. Variant III of project activity scheduling

Variant III has a total execution duration of 745 hours over 36 days (Variant II: 44 days), with a total cost of €21,141.43 (Figure 9).

	Start	Finish
Current	Mon 2/19/24	Mon 4/8/24
Baseline	NA	NA
Actual	NA	NA
Variance	0d	0d

	Duration	Work	Cost
Current	35.5d	745h	€21,141.43
Baseline	0d	0h	€0.00
Actual	0d	0h	€0.00
Remaining	35.5d	745h	€21,141.43

Fig 9. Project characteristics – Variant III

3.3 Implementation of Variant IV of the Project

In Variant IV (Figure 10), *Fast-Tracking* was applied to reduce execution time by overlapping four activities—*Project Review, TD Procurement, Final Inspection and Quality Control, and Preparation for Transport*—with their predecessors. Combined with additional human resources, this approach shortened the project duration from 36 to 32 days, improving efficiency in design, procurement, and manufacturing (Figure 11).

	Start	Finish
Current	Mon 2/19/24	Tue 4/2/24
Baseline	NA	NA
Actual	NA	NA
Variance	0d	0d

	Duration	Work	Cost
Current	31.75d	747h	€21,147.43
Baseline	0d	0h	€0.00
Actual	0d	0h	€0.00
Remaining	31.75d	747h	€21,147.43

Fig 10. Project characteristics – Variant IV

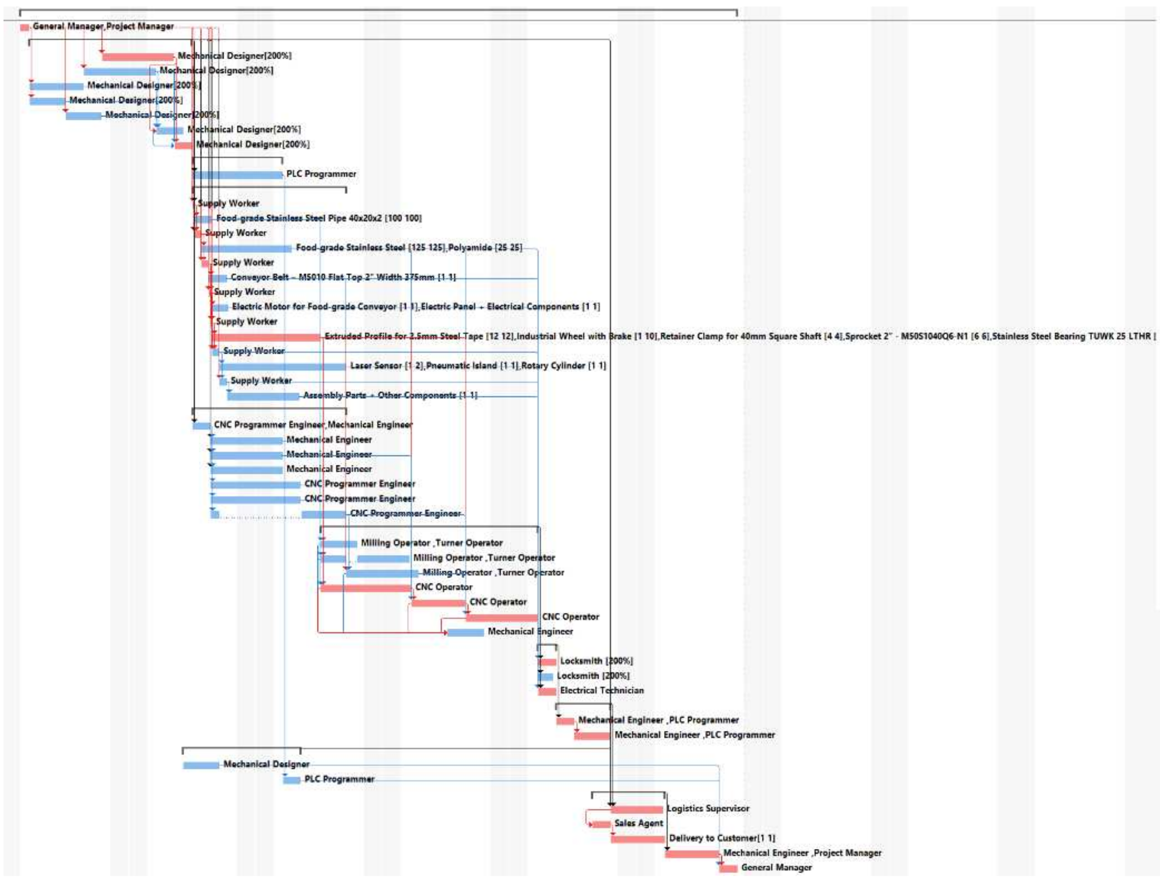

Fig 11. Variant IV of project activity scheduling

The project progressed from contract signing through design and procurement to final assembly and testing, with tasks scheduled in parallel where feasible. Final validation included two testing phases to ensure system functionality and compliance before delivery to the client.

The project concluded on April 2 with delivery and testing at the client's site, confirming balanced use of time, cost, and resources. Economic results for Variant IV are shown in Figures 11 and 12, highlighting overall costs and their distribution.

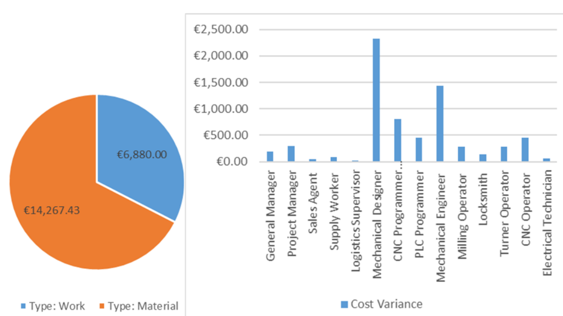

Fig 12. Resource Cost Overview and Cost Variance– Variant IV

4. ASSESSMENT OF PROJECT IMPLEMENTATION OPTIONS

The results for the four project variants of the Z Transport Conveyor are shown in Table 4, comparing duration, total cost, and daily cost. Variant II has the longest duration at 43.25 days, with a total cost of €20,146.18 and a daily cost of €465.81, reflecting a balanced use of resources. Variant III shortens the project to 35.5 days, with a cost of €21,141.43 and a daily cost of €595.53, balancing time and cost. Variant IV finishes in 29.75 days, but with the highest daily cost of €747.00, indicating more resources are allocated to reduce time.

Table 4.

Distribution of total costs, hours of activity, execution time for each project

Variant	Durations (days)	Total cost (euro)	Cost /day (euro)
Var. I	31	19490.18	628.72
Var. II	43.25	20146.18	465.81
Var. III	35.5	21141.43	595.53
Var. IV	29.75	21147.43	747.00

Table 4 compares the four variants based on duration, cost, daily cost, total hours worked, and hourly costs, including materials and labor. Figure 13 illustrates the comparison of execution durations and total costs, showing that the shortest duration (Variant IV) results in higher costs, while variants with longer durations (Variants II and III) distribute costs more evenly.

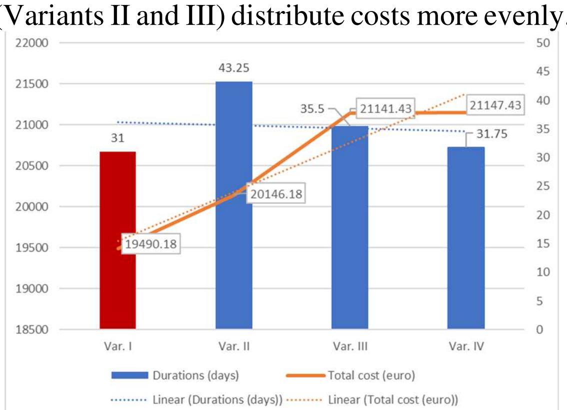

Fig 13. Evaluation of project variants Durations (days) - Total cost (euro)

Figures 14 and 15 analyze the relationship between total project cost and hourly cost, as well as project duration and cost per working hour, highlighting the efficiency of resource utilization and the balance between time and expenses for each variant.

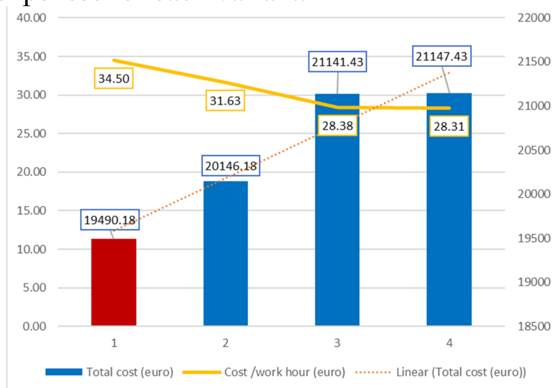

Fig 14. Evaluation of project variants Total cost (euro) - Cost/hour (euro)

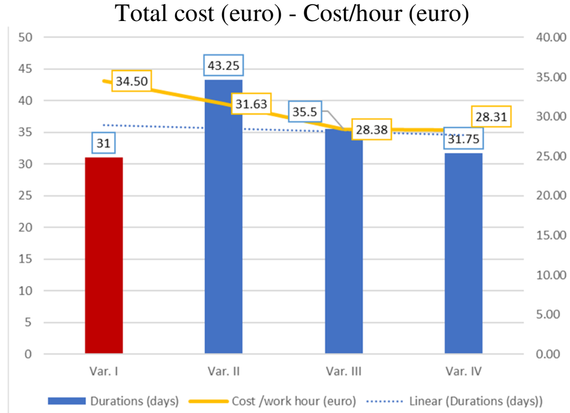

Fig 15. Evaluation of project variants Durations (days) - Cost/work hour (euro)

Figure 16 demonstrates the successful implementation of the Z Transport Conveyor product at the client's production line, confirming the positive impact of efficient planning and execution.

Fig 16. *Z Transport Conveyor* product implemented in the customer production line

5. CONCLUSION

The application of Microsoft Project in managing the Z Transport Conveyor product assimilation project provided key benefits, including optimized execution time, reduced costs, and improved resource allocation. By using the CPM, critical activities and their dependencies were identified, enabling efficient task and resource planning.

Through analysis of implementation scenarios (Variants I, II, III, and IV), it was clear that adding resources such as a *Mechanical Designer, Mechanical Engineer, and CNC operator* significantly reduced project duration. The timeline was shortened from 44 days (Variant II) to 30 days (Variant IV), improving the manufacturing process.

Microsoft Project offered valuable tools like *Gantt and PERT charts*, along with resource and cost tables, providing a comprehensive view of the project's resources and costs. The software's ability to automatically recalculate resource costs and effort based on time units enabled efficient schedule adjustments.

In conclusion, *Microsoft Project* played a critical role in reducing execution time and optimizing costs. The methods used proved that effective planning and resource management are crucial for the successful completion of a product assimilation project within a shorter timeframe and at lower costs.

6. REFERENCES

[1] Shin, K. S., Park, J.-O., Kim, Y. K., *Multi-objective FMS process planning with various flexibilities using a symbiotic evolutionary algorithm*, Comput. Oper. Res., 38(3), pp. 702–712, 2011

[2] Lock, D., *Project Management*, 8th ed., London: Routledge, 2018

[3] *The Critical Path Method (CPM)*, in *Construction Project Scheduling and Control*, pp. 43–81, 2010

[4] Schwalbe, K., *Information Technology Project Management*, Cengage, Mason, OH, 2018

[5] Kerzner, H., *Project Management: A Systems Approach to Planning, Scheduling, and Controlling*, 13th ed., 2021

[6] Nicholas, J. M., Steyn, H., *Project Management for Engineering, Business and Technology*, 6th ed., Proj. Manag. Eng. Bus. Technol., February, pp. 1–732, 2020

[7] Tam, P. W. M., Palaneeswaran, E., *The use of enhanced positional weight method for constrained resources project scheduling*, Can. J. Civ. Eng., 26(2), pp. 242–247, 1999

[8] Garza, J. M., Franco-Duran, D. M., and Buckley, B., *CPM Benefits in Estimating, Bidding Reported in Survey*, https://www.enr.com/articles/43666-cpm-benefits-in-estimating-bidding-reported-in-survey

[9] Singh, H., and Williams, P. S., *A Guide to the Project Management Body of Knowledge (PMBOK Guide) – Seventh Edition and The Standard for Project Management*, Project Management Institute, Inc., 2021

[10] Blaga, F., Pop, A., Hule, V., Karczis, A., and Buzdugan, D., *Using critical path method for a new project scheduling – the case of a new product launch in production*, IOP Conf. Ser. Mater. Sci. Eng., 1009, p. 012005, 2021

[11] Microsoft Corporation, *Microsoft Project User Guide. Microsoft Docs*, https://support.microsoft.com/en-us/project

[12] Calderon-Tellez, J. A., Bell, G., Herrera, M. M., Sato, C., *Project management and system dynamics modelling: Time to connect with innovation and sustainability*, Syst. Res. Behav. Sci., 41(1), pp. 3–29, 2024

[13] Blaga, F. S., Stănăşel, I., Pop, A., Hule, V., Craciun, D., *Assembly project management of a suspended conveyor*, IOP Conf. Ser. Mater. Sci. Eng., 568(1), pp. 1–5, 2019

[14] Abele, E., Metternich, J., Tisch, M., Kreß, A., *Best Practice Examples*, in *Learning Factories: Featuring New Concepts, Guidelines, Worldwide Best-Practice Examples*, Abele, E., Metternich, J., Tisch, M., and Kreß, A. (Eds.), Cham: Springer International Publishing, pp. 391–637, 2024

[15] Kerzner, H., *Project Management: A Systems Approach to Planning, Scheduling, and Controlling*, 12th ed., John Wiley & Sons Inc., 2017, http://scioteca.caf.com/bitstream/handle/123

456789/1091/RED2017-Eng-8ene.pdf

[16] Project Management Institute, *A Guide to the Project Management Body of Knowledge*, 5th ed., Project Management Institute, Inc., 2017

[17] Caggiano, A., Teti, R., *Digital factory technologies for robotic automation and enhanced manufacturing cell design*, Cogent Eng., 5(1), pp. 1–14, 2018

[18] Ranky, P., *Aerospace Design for Manufacturing, Assembly, Quality, Inspection, Service, Hi-tech Project Management and Maintenance Engineering Challenges and Solutions*, 2016

[19] Yao, B., Xu, W., Shen, T., Ye, X., Tian, S., *Digital twin-based multi-level task rescheduling for robotic assembly line*, Sci. Rep., 13(1), p. 1769, 2023

Managementul proiectului de asimilare a produsului conveior de transport în Z utilizând Microsoft Project

Lucrarea explorează aplicarea metodei Drumului Critic (CPM) în dezvoltarea și implementarea unui nou proces de fabricație utilizând Microsoft Project. Studiul analizează managementul implementării unei noi structuri de fabricație, folosind un caz provenit de la o companie de fabricare de piese auto din Oradea. Procesul a început cu identificarea tuturor activităților necesare pentru proiect, urmată de stabilirea relațiilor de dependență (precursori) pentru fiecare activitate. Resursele umane și materiale necesare pentru executarea proiectului au fost identificate cu ajutorul managerului de proiect și al echipei tehnice, iar costurile asociate (fixe și variabile) au fost determinate. Toate datele au fost introduse în software-ul Microsoft Project pentru analiză. Utilizarea Microsoft Project a dezvăluit posibile probleme în implementarea proiectului, cum ar fi lipsa de resurse, activitățile critice și timpul total de implementare. Aplicarea software-ului a facilitat optimizarea proiectului prin identificarea precisă a drumului critic, reducerea timpului de execuție și furnizarea unei vizualizări clare a costurilor. Lucrarea oferă o metodă de optimizare a proiectării și implementării unui nou sistem de fabricație. Abordarea ajută managerii de producție în modificarea sau implementarea noilor structuri de fabricație, urmărirea progresului și vizualizarea costurilor. Această metodă reprezintă un instrument eficient pentru gestionarea execuției proiectului. Lucrarea subliniază avantajele utilizării metodei drumului critic în modernizarea și transformarea structurilor de fabricație prin utilizarea Microsoft Project.

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