Management Plan

Mold & Co in China

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Introduction

This document describes all aspects of the ChineseTooth project which the main goal is to install IT systems around the new production line in the eco-city of Taijin. This project includes a social and ecological aspect in order to fit to the requirements of Taijin city guidelines.

In this document, we describe what are the goals, the processes, the planning and the risk of such deployment in China.

Project description

The main goal is to install a toothbrush production line in the eco-city of Taijin in China. Our company is workig for MOLD & Co. to make this production line a reality.

Our main guideline in this project is to install a production line that can produce a great amount of toothbrushes within an eco-city. This project needs to be respectful of the surrounding environnement and social aspects of the project's stakeholders.

2.1 Specifications

This project has to achieve the following specifications.

The production line must contains all the required machines to automate the production of toothbrushes. Theses machines include moulting machine, stamping machine, tufting machine, bristle cutter machine, bristle trimming machine and Packaging machine. These machines need to be bought and connected to each other in order to build the full product.

To connect all the machines in the assembly line, the project requires also a full digital connection to an internal network. This network group all connected machines and database servers to store monitoring informations about the production. These informations represents the current production, the past production and potential errors in the production line.

The production line is fully automated through this network and the production is regulated to produce exactly what is needed. This automatisation brings many advantages including the environmental impact reduction, reduction of the storage requirement of finished products and 24/7 production in case of huge demand.

The informations collected need to be displayed to the employees in charge of the production line. These informations are displayed through an interface reading the monitoring data from the database. A master server has to be installed in order to control all machines and to control the production flow.

Several materials are required to produce toothbrushes. These materials are plastics, nylons, brass wires, papers box packing, plastinc hard container packaging, high frequency blister packaging and blister card packaging. The project must include a storage space for all these material and human resources to load the resources in the appropriate machines.

All the production line machines, storage and digital network requires engineering the organise all these components depending on the space available and the shape of the building. Enginieering human resources are required to create, configure and install manitoring system. Human resources may also be required to manipulate machines, connect each machine to the other and install network.

2.2 Strenghts

The strenghts of the project are mainly focused on the high effeciency of the production line. This high effeciency is garanteed by the monitoring system and the automatic management of the amount of product produced on the assembly line. This project represents a great opportunity to modernize the production of MOLD & Co. and automate the assembly line. By automating the assembly line, MOLD & Co. gain a lot of money on storage of manufatured products and human resources.

2.3 Weaknesses

This project have also small weakness that may have an impact on risks (Risk managment will be covered in the section 6).

The main weakness are the important amount of advanced technologies that requires high qualified employees in charge of the installing and maintaining the autonomous system of the assembly line. Another weakness is the requirement of heavy and pricy machines that can represent a major part of the project's costs.

2.4 Social & Environmental guidelines

As our project takes place in the eco-city of Tianjin, it must include proper social and environmental guidelines. Theses guidelines are and must be evaluated during the project to qualify if these are possible to set up with MOLD & Co. budget.

2.4.1 Social engagement for project human resources

These guidelines includes social engagements for the well being of employees and human resources during the project.

Working hours For employeese better productivity, it could be good to restrict to 8 hours the day of work to complete a full week withing 44 hours. We must audit reguarly our employees about their opinion and well-being within the company through feedbacks.

Human rights and equity Our project must respect the human rights about children labor or unpaid employees. These are forbidden. Finally, our employees salary musn't depend on gender, race or physical ability.

Health Thus, our project is about health product. We must establish health requiremets to reduce bacterial or viruses risks during toothbrushes production. We must include protection against noise and injury risks on the production line. That include collective equipments like protective foam, barrier, etc. But also personnal equipement like hear protections, gloves, etc. And we could give an introduction to the handling of machines for all employees to avoid injuries.

2.4.2 Environmental guidelines

Waste and recycling We must establish a plan and write good practicies about material waste in order to reduce our waste that have a huge environmental impact. Our automation system must optimise production in order to reduce waste. We could also collect rainwater in order to use it in bathrooms or for floor washing.

Effeciency We could invest in machines that are more profitable and resource-efficient to reduce the resources required to get the assembly line working. Moreover, it could be good to progressively invest in renewable energy in order to reduce our energy-related environmental impact. This includes solar panels, wind turbines or heat pumps that can be installed outside of the building or on employees parking.

Building optimizations The whole building could include some automations to reduce environmental impact and reduce energy waste. These automations includes auto-switch lights and computers when there are not used.

Machine repairs To reduce environmental impact and keep our machines as long as possible, it's possible to introduce a repair culture during the project and after. This repair guidelines include bying repairable machines, recycle spare parts of deffective machines and train employees about machine repairing.

Delivery guidelines Delivery is a huge part of our environmental impact. To reduce it, we could group most of our delivery to reduce waste of space in polluting transports like trucks. We could also promote rail transport over trucks transport. This transport method are way less polluting but more expensive. However high-speed train are actually developing in china, thus it would be less expansivein the future.

2.5 Local investments & suppliers

Local investment It could be good, to participate in local project of Taijin. This investments could represent a good opportunity to communicate on the green engagement of MOLD & Co..

suppliers guidelines MOLD & Co. must audit it's suppliers in order to evaluate there social and environmental impact and be sure they fits with our own requirements.

Local implication Our factory is in a city and MOLD & Co. must communicate with local authorities about what it's happening in the factory. Local authorities include Tanjin City Hall and People's Republic of China government. MOLD & Co. must inform authorities about environmental risks and how we will manage it in such case. We also require to be informed about local chinese health and sanitary requiremet in order to be consistent with it.

Actors and Stakeholders

We have assembled all the actors of the project in a clear and precise way in order to identify them. You will first find the different actors who have an impact on the project. Secondly, the stakeholders and their position in the project. Finally, the teams that need to be set up.

3.1 Actors impacting the project

You will find below a table containing all the actors having an impact on the project. All the stakeholders were identified and analysed according to the client's needs by the Cesi conseil team.

There are four columns :

Name : it is the name of the actor and stakeholder.

External or Internal to MOLD & Co. companie : The actor in question is internal or external to MOLD & Co.. This is its positioning within the project.

State : what type of domain is the actor affiliated.

Influence level : this is the level of importance of the actor in the project.

Name	External or internal	Status	Influence level
Mold and Co - HR department	Internal	Supervision	Important
Mold and Co - Production department	Internal	Manufacturation	Important
Mold and Co's direction	Internal	Client	Important
Cesi conseil	External	Provider	Important
Mold and Co's - It department	Internal	Supervision	Medium
Mold and Co's - Maintenance department	Internal	Supervision	Medium
Mold and Co's - Logistic department	Internal	Supervision	Medium
Tianjin city hall	External	Notice of construction	Important
People's Republic of China government	External	Supervision	Important
Suppliers	External	Supply	Important

Figure 1 – Table of stakeholders

3.2 Setting up teams

Following the stakeholder analysis for this project, we set up teams to maximize the company's production and meet the Chinese company's standards.

These are three teams distributed as a service to ensure the proper functioning of the company Chinetooth.

Name	Objective	influence level
Human Resource department	Recruit new employees, retain them and develop their skills.	Important
Engineering department	Conception, resource planning, scheduling, recording and traceability of production activites	Important
Assembly line installation department	storage and installation of machines	Important

Figure 2 – Table of teams working on the project

Humain resource department : will help to maintain a stable workforce over the long term.

Engineering department : its objective is to continuously improve the management of flows and stocks included in the work chain that begins with suppliers and ends with intermediate or end customers. There are three engineer department, one for machines, second for network and the last for industry 5.0.

Assembly line installation department : the role of the marketing department is to define a company's strategy by proposing products and services that will promote the development and sustainability of Mold & Co. There are three teams, one for resource installation, second for network installation and the last for IoT installation.

Project planning

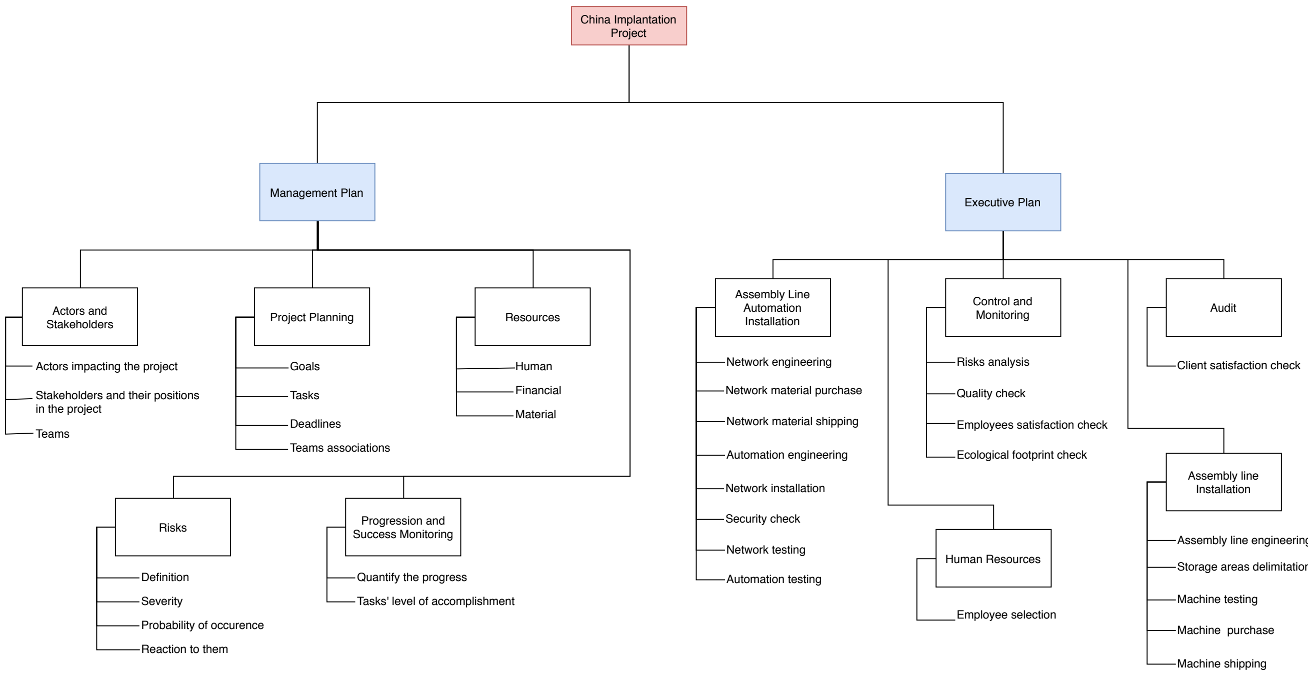


Figure 3 – Work Breakdown Structure of the project

4.1 Tasks

The project is separated into many tasks that represent all steps needed to reach the goal of the project. These tasks are separated in two categories : *Management plan* in which all the tasks represents the redaction od the management plan of the project and *Executive plan* the represent the active part of the project in which the assembly line is installed.

4.1.1 Management Plan

The management plan is the part in which each step of the project is defined. The management plan is defined as a frame for the project and theses tasks must be achieved before all executive tasks. This part begins with a precise description of the project and goals followed by the 5 next parts.

Actors and Steakholders These parts, we must think and describe all the actors involved in the project. These actors are stakeholders and can interact in some way with the project. The description includes their position, their importance and the manner that they interact with the project. This task has also a goal of definition different teams that are required to bring this project to life.

Project planning Within this task, we must think and describe all the tasks required to finish the full project, the time and resources required to achieve each task and what are task dependencies. In this task, we must define what are deadlines and when to make debriefing and evaluate the progression of the project.

Resources In this part of the project, we must identify and write the required resources to achieve each task defined in the *Project planning* part. These resources include human resources, financial resources, and material resources.

Risks In this task, we must define the primary risks that can occur during the project and how to reduce the side effect of each risk. Each risk has a severity and probabilty rate that represent the criticality of it. Higher the criticism is, important the risk must be and planned with caution.

Progression and success monitoring Finally, in the progression monitoring, we must identify what indicator can represent the progression or the success of each task and the whole project. These indicators will be used all along the project to define its progression and if some tasks are taking late.

4.1.2 Executive Plan

The executive plan indicates all actions done after the work on the management plan. This category includes the installation of the assembly line and its automation, but also it is control and monitoring, besides the human resources and an audit of the client.

Assembly Line Installation This part aims to identify the processes brought by the installation of the assembly line. After an assembly line engineering, in which we study the building disposal, where and how the machines will connect with themselves, we also study the place for the storage areas. We then test the machines after their purchase and their shipping.

Assembly Line Automation installation This part is about the automation of the assembly line, which includes a network engineering (the study of the disposal of the network in the building), the purchase of the material for this network (routers, switches, etc.) and their shipping to the building, before their installation and test. We also study the automation of the machines, how it will work, and how to put it in place, with also a testing session and a security check.

Human Resources The human resources part identifies the employee selection process. Those employees must be fit to the required tasks of the executive plan. To the study of the building and another engineering around the machines to the installation of the automation of those machines, and their control and monitoring.

Control and Monitoring After the installation of the machines and their automation set, we must control and regulate them. This includes the risks analysis process, which means a constant control and verification of the assumed risks but also an answer plan in the case of a crisis. We also check on the quality of the machines, their cleanliness and their working order, but also the employee's satisfaction as we want to be sure they work in an environment as comfortable as possible. In the same way, we want a constant control of the ecological footprint of the building to respect our environmental engagements.

Audit Finally, this task is required to retrieve some feedback from the client. This feedbacks can lead to an improvement process and can be added to our quality pipeline in order to continuously improve our practices.

4.2 Gantt diagram

The Gantt diagram of this project recapitulating all our planning is in the first Annex of this document. This is an export of Microsoft Project's file of this project.

Required resources

5.1 Human cost

The human cost we analyze represents the amount of work in days and the remuneration of everyone involved in the realization of, based on our project planning, the two parts (the initial part with the management plan, and the executive plan with the installation and monitoring of one assembly line, and the formation of the employees to the handling of the machines). The costs are based on the total number of days of work,the persons involved, and the average price cost of the employees which you can see in this table.

Senior Engineer (french)	35 000€/year
Junior Engineer (french)	20 000€/year
Senior Engineer (local)	26 000€/year
Junior Engineer (local)	13 000€/year
Technician (french) -includes travel and cost of living	6 500€/week
Technician (local)	300€/week

Figure 4 – Average employee cost

To calculate the cost we used the working rules in France and China :
– In France : 35 hours of work per week and 272 days of work per year.
– In China : 40 hours of work per week and an average of 345 days of work per year.

The next table will present the different types of actors (employees) of this project and how much they are paid per hour according to the average employee cost of the previous table and the working rules for each country.

Title	Cost	Cost per hour (according to the working rights of the associated country)
Senior Engineer (french)	35 000€/year	18,38€/hour
Junior Engineer (french)	20 000€/year	10,5€/hour
Senior Engineer (local)	26 000€/year	9,42€/hour
Junior Engineer (local)	13 000€/year	4,71€/hour
Technician (local)	300€/week	7,5€/hour

Figure 5 – Average employee costs per hour

With this data, we now analyze the number and type of the actors of each part and calculate the total cost.

5.1.1 Initial part

The initial part took place for 4 days and involved a team of five french engineers, one leader senior engineer and four junior engineers. The cost is calculated according to the french working rule of 35 hours of work a week, so 7 hours a day.

Actors	Unit Cost for 4 days	Total Cost for 4 days
1 Senior Engineer (french)	514,64 €	514,64 €
4 Junior Engineers (french)	1 176,00 €	4 704 €
		TOTAL : 5 218,64 €

Figure 6 – Initial part cost

5.1.2 Executive part

According to the Gantt diagram, the executive part is 102 days long, minus 80 days of equipment shipping (twice 40 days), it represents 22 days of work. During these 22 days, 7 Chineses engineers and 10 Chineses technicians/regular employees (counted as technicians), as you can see here, we estimated these numbers while partitioning the executive part (installation and monitoring/control) in different tasks.

Tasks	Number of engineers	Number of technicians/employees
Assembly line automation and Network	3 senior engineers - 1 junior engineer	3 technicians - 1 employee
Control and Monitoring	1 senior engineer - 1 junior engineer	X
Human Resources	X	1 employee
Assembly line installation	1 senior engineer	4 technicians - 1 employee
	TOTAL : 7 engineers	**TOTAL : 10 technicians/employees**

Figure 7 – Number of employees for the executive part

The cost is calculated according to the Chinese working rule of an average of 40 hours of work a week, so 8 hours a day.

Actors	Unit Cost for 22 days	Total Cost for 22 days
5 Senior Engineers (local)	1 657,92 €	8 289,60 €
2 Junior Engineers (local)	828,96 €	1 657,92 €
10 technicians (local)	1 320 €	13 200 €
		TOTAL : 23 147,52 €

Figure 8 – Executive part cost

5.1.3 Formation

The 17 employees involved in the executive part need to be tought how an assembly line works, how to handle the machines, how they work and also their security rules.

We estimated the cost of such a formation of 3000 euros per person (a total of 51 000 euros for the 17 employees) and 5 days, also counted as 5 days of works for them.

Actors	Unit Cost for 5 days	Total Cost for 5 days
5 Senior Engineers (local)	376,80 €	1 884,00 €
2 Junior Engineers (local)	188,40 €	376,80 €
10 technicians (local)	300 €	3 000 €
		TOTAL (+ 51 000 €) : 56 260,80 €

Figure 9 – Formation cost

With these three parts, we reach a total human cost of **84 626.96 euros.**

5.2 Material cost

This cost is about every material directly used in one assembly line and its cost. Our assembly line will include :

- Handle molds, to make the brush handle (an average of 2 per injection machine).
- An injection machine, to mold the shape of the toothbrushes.
- A tufting machine to tuft on brush holders.
- A trimming and end rounding machine to cut and shape the bristles to the manufacturers specification, and to round them to be softer and more comfortable to the teeth.
- A fully automated packaging machine to pack the toothbrushes.
- And of course conveyers belt which will link these machines together. We estimated an average of 4 meters between machines, so we would need around 16 meters of it.

All of it would be around 30 square meters.
We have access to two types of injection machines, a 50T and a 80T, which means it is a 50/80 ton servo-motor operated machine, the maximum clamping force with these machines is either 50 or 80 tons. Servo-motors are used for energy saving, so these machines give the highest energy saving in hydraulic machines. In this estimation we chose the 80T injection machine for a better energy saving.

To calculate the total cost, we used this table of average prices.

Handle Mold	8 000€/piece
Injection Machine : 80T	45 000€/machine
Injection Machine : 50T	30 000€/machine
Tufting Machine	20 000€/machine
Trimming and End Rounding Machine	25 000€/machine
Fully Automated Packaging Machine	60 000€/machine
Conveyer Belts	1 000€/meter
Electrical/Hydraulic/Water Costs	3 000€/post

Figure 10 – Average machine costs

We have 5 machines in our assembly line. We decided, for the electrical/hydraulic/water costs, that there will be a maximum of 3 machines by post, so 2 posts for one assembly line, which will cost 6 000 euros.

Machines	Cost
Handle molds (2)	16 000 €
Injection machine (80T)	45 000 €
Tufting machine	20 000 €
Trimming and end rounding machine	25 000 €
Packaging machine	60 000 €
Conveyers belt (16 m)	16 000 €
	TOTAL (+ 6000 €) : 188 000 €

Figure 11 – Machines costs for one assembly line

So, the total machine cost for one assembly line is **188 000 euros**.

We reach a total estimation cost of **272 626.96 euros** with both the human cost and the machine cost.

Risks management plan

Considering that Mold & Co's new production plant implies an important and complex system, we have to identify and evaluate all the risks inherent to this system in order to limit them the most possible. This risk analysis will allow us to help designing the new production system by establishing the most efficient preventive and correctives measures.

In order to deal with the risk management, we decided to use the FMECA Method on the means of production of Mold & Co company. This means that we consider all the risks related to the operation of the assembly line system.

6.1 Plan

For that purpose, we have to, as a first step, describe the overall production system. Then we will be able to identify all the threats. After this step, we will identify all the threats that could affects the system and assess them in order to define their criticality.

Ultimately, we will see how to compensate these eventual failure modes where appropriate.

6.2 Description of the system

The assembly line system is composed of two main parts : the mechanical system and the computing's one.

By the way, we estimate that these two systems are interdependent. In other words, we have to take into account that if the mechanical part of the assembly line fails, the entire system cannot work anymore and vice versa.

Actually, mechanical part of the production chain can work independently but if the computing system is not working, the mechanical will encounter problems about its regulation and monitoring.

6.3 Definition of the risk assessment

According to the FMECA Method, we have to assess three different values in the table of risk.

First of all, the Severity (S) which equals to the importance of the consequences that the risk could induce on the production of the factory. More the risk can affect the production line, more the Severity level is high as the following table shows :

Then we have to assess the Occurrence (O) of the risks. The occurrence enables us to

Severity definition	Severity level	Associated color
Insignificant	1	green
Minor	2	light green
Significant	3	yellow
Serious	4	orange
Major	5	red

Figure 12 – Table of severity level

measure the likelihood of the risk. Mire the risk is potential, more the Occurrence value is high as we can see as below :

Occurrence definition	Occurrence level	Associated color
Remote	1	green
Very low	2	light green
Low	3	yellow
Moderate	4	orange
Major	5	red

Figure 13 – Table of occurence level

Finally, the Detection (D) is measured according to the ease for the operators to discover a failure mode. As we can see on the below table, higher the value is, harder it is to detect the issue.

Detection definition	Detection level
Blatant	1
Easily identifiable	2
Discreet	3
Hard to identify	4
Very hard to identify	5

Figure 14 – Table of detection level

6.4 Calculation of the criticality and risk priority numbers

In sum, Severity, Occurrence and Detection are arbitrarily assessed whereas Criticality and RPN are calculated from these same data.

Especially, we have the following relations :

— Criticality = Severity Occurrence

— RPN = Severity Occurrence Detection = Criticality Detection

These last two measures enable us to prioritize the risk in order to make the further effort in order to limit them and eventually resolve them if ever they occur.

Calculation of the criticality and risk priority numbers

In sum, Severity, Occurrence and Detection are arbitrarily assessed whereas Criticality and RPN (Risk Priority Number) are calculated from these same data.

Especially, we have the following relations :

$$Criticality = Severity \times Occurrence$$

$$RPN = Severity \times Occurrence \times Detection = Criticality \times Detection$$

These last two measures enable us to prioritize the risk in order to make the further effort in order to limit them and eventually resolve them if ever they occur.

SEVERITY						
	5	5	10	15	20	25
	4	4	8	12	16	20
	3	3	6	9	12	15
	2	2	4	6	8	10
	1	1	2	3	4	5
		1	2	3	4	5
		OCCURRENCE				

Figure 15 – Severity occurences

After having defined all the measure required in order to assess the risks. We can now list them,

evaluate their Severity (S), Occurrence (O), Detection (D) and thus calculate for each one, their criticality (C) and their Risk Priority Number (RPN).

Identifier	Failure mode	Failure causes	Failure effect	Detection method	Corrective actions	S	O	D	C	RPN
A	Power outage	Equipment disfunction	Stop of the production	Beep	Inverter and external batteries	5	4	1	20	20
B	Noise pollution	Equipment disruption	Employee's discomfort	Error message	Automatic measurement and earplugs	1	2	2	2	4
C	Inherent materiel defect	Obsolescence	Slowdown or stop of the production	Error message	Periodic maintenance	5	4	2	20	40
D	Earthquake	Environment	Stop of the production	Sound and tremors	Earthquake protection	4	1	1	4	4
E	Fire	Overheat	Stop of the production	Beep (fire alarm), flames	Fire prevention system	4	1	1	4	4
F	Lack of raw materials	Desynchronization	Stop of the production	Alert message	Provider proximity and Daily stock's review	4	2	1	8	8
G	Short circuit	Equipment disfunction	Slowdown or stop of the production	Alert message	Circuit-breakers	4	3	1	12	12
H	Absence of a main operator	Leave	Relative stop of the production	Control presence of the employees	Control presence of the employees	3	4	1	12	12
I	Local network outage	Broken cable	Stop of the production	Error message	Network connection cable redundancy	5	5	1	25	25
J	Lightning	Environment	None	Lightning sound	Lightning rod	1	1	1	1	1
K	Flood	Water leak	Eventual stop of the production	Leak detectors	Water recycling system	2	3	1	6	6
L	Over-voltage	Insulation failure	Stop of the production	Alert message	Circuit-breakers	4	2	1	8	8
M	Vandalism	Human error	Slowdown or stop of the production	Cameras	Cameras and Intern investigation	4	2	2	8	16
N	Overload	Equipment dysfunction (disruption)	Slowdown or stop of the production	Error message	Regular control of the equipment's settings	4	3	2	12	24
O	Product quality defect	Human error	Slowdown of the production	Block of the equipment	Regular quality controls	2	3	1	6	6
P	Environmental pollution	Equipment dysfunction (disruption)	Penalty	Pollution traces	Regular analysis on the water and other resources	3	3	3	9	27
Q	Non respect of deadlines	Wrong estimation of the delays	Economic losses	Project management	Recursive estimation	3	5	2	15	30
R	Employee's injury	Accident	Eventual slowdown of the production	Complain	None	3	1	1	3	3

Figure 16 – Risk table

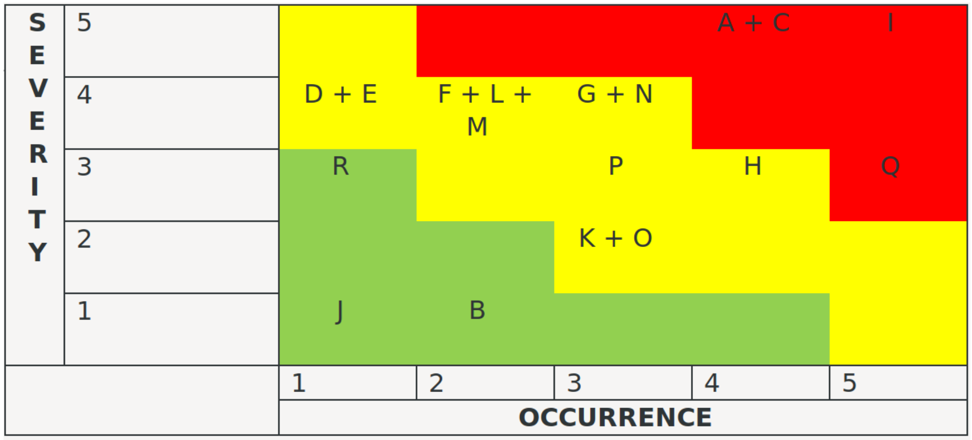


Figure 17 – Table of severity

7.1 Prevention and correction of the risks

What we can conclude from this table is that four risks : A, C, I and Q are particularly important as their criticality is in the red color so high priority.

Then we have to pay a special attention to these one and foresee strong corrective actions in order not only for prevention but also for correction.

Particularly, for these risk we decided to :

- Power outage (A) : provide external batteries while the failure is not resolved
- Inherent materiel defect (C) : plan periodic maintenance on all the different machine consisting in verifying all its functionalities
- Local network outage (I) : foresee a double connection on the machines for the local network so that if one is defaulting, the other will relay the connection
- Non respect of the deadlines (Q) :
  - foresee provisional timeline of 10% of the time required to achieve the project
  - daily checks of the projects progress

Indicators of progression and success

The planning and development of the installation of toothbrush production line in the eco-city of Taijin in China is guided by a comprehensive set of Key Performance Indicators (KPIs) covering its ecological, economic and social development.

There are seven quantitatives and three qualitatives KPIs.

8.1 Quantitatives KPIs

8.1.1 Developing a Dynamic and Efficient Economy

Use of renewable resources : using recycled resources to save money by 40%.

Control the production : Production control to avoid overproduction, which can be costly in terms of storage and resources.

Transportation : Use intelligent way of transportation in order to save mony by 60%.

Client satisfaction : Gather user feedback to improve the product.

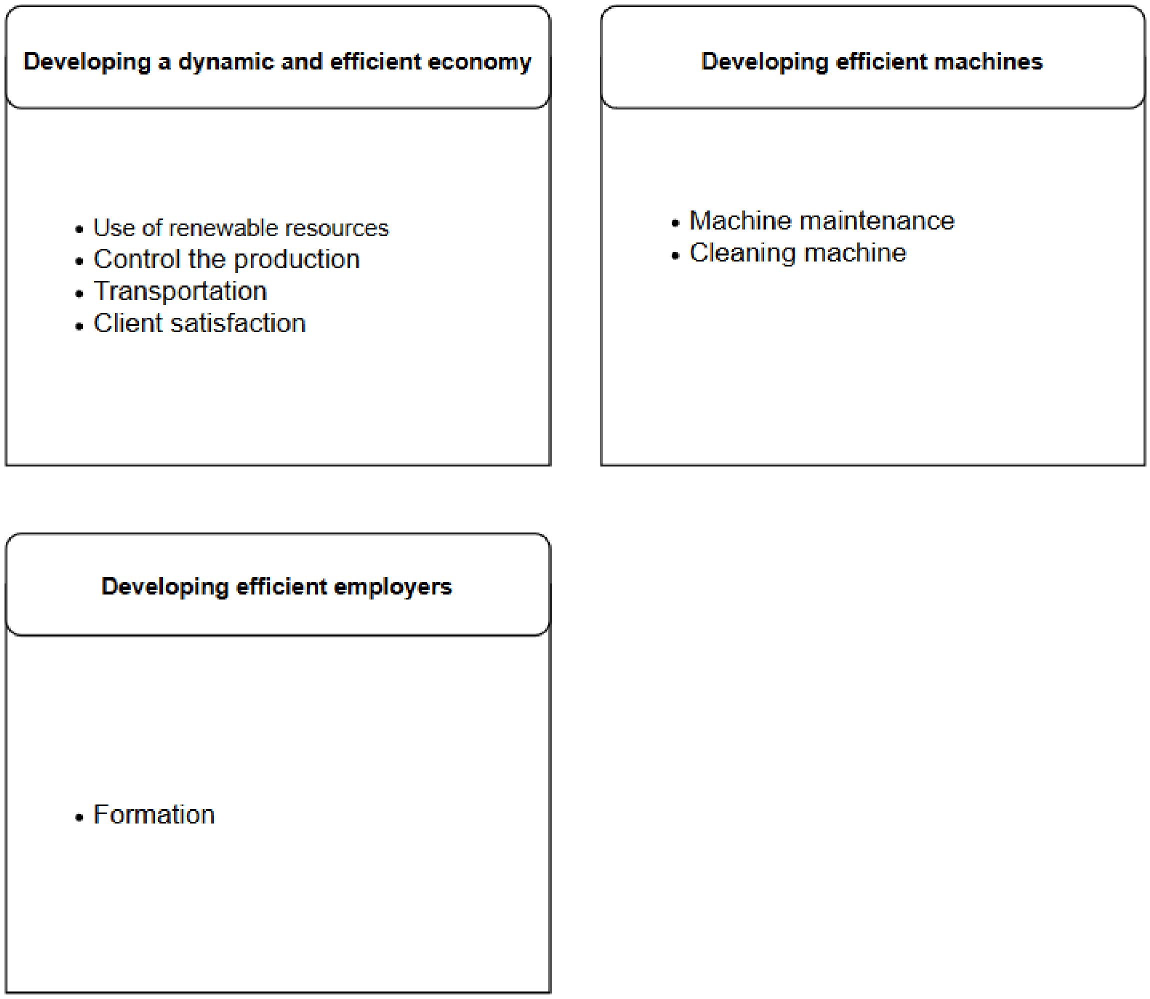
8.1.2 Developing efficient machines

Maintenance machine : machines must be operational at least 99% of the time.

Cleaning machine : the machines must not know any dirt that may impact the quality of the product.

8.1.3 Developing efficient employers

Formation : In order to improve the quality and productivity of employees by 70%.



8.1.4 Qualitative KPIs

- Maintain quality and safe production through careful monitoring of machines and production.
- Adopt safety policies for employees that will promote their well-being and the smooth running of production.
- Maintain the most eco-responsible production line by following the environmental standards in the factory.

Conclusion

The company Mold & Co called our company (Cesi conseil) to set up a 5.0 toothbrush production line. This production line is being set up in China, in Taijin. This city is known to be eco-responsible. It is therefore important to monitor social and ecological aspects in order to follow the city's standards.

The implementation of this production line will allow the company to benefit from an increase in turnover. However, with the different aspects of the installation, risks can arise. It is important to note the risk analysis in this document.

For the better of the organization of this project, the realization of a task schedule (WBS) was done. In addition to this, the creation of the whole planning of the projet in the form of a Gantt planning. As a result, an analysis of the project's stakeholders concluded with the creation of three teams.

The implementation of KPI makes it possible to know the performance and success indicators of the implementation of the production line.

Finally, thanks to the budget, our team studied the need for the necessary resources to carry out this project.

Annex 1 : Project Gantt diagram

You can found our Gantt project in the following pages.

N°		Mode Tâche	Nom de la tâche	Durée	Début	Fin	Prédécesseurs	Noms ressources	Travail	Coût	9 M J V S
1			**China Implementation Project**	**140 jrs**	**Ven 11/10/19**	**Jeu 21/05/20**			**9 631 h**	**117 582,12€**	
2			**Agreement**	**15 jrs**	**Ven 11/10/19**	**Mar 05/11/19**			**568 h**	**11 360,00€**	
3			Contract	1 jr	Ven 11/10/19	Lun 14/10/19		Management Team[5]	40 h	800,00€	
4			creation of a draft technical data sheet	2 jrs	Lun 14/10/19	Mer 16/10/19	3	Management Team[5]	80 h	1 600,00€	
5			Special features for customers	3 jrs	Mer 16/10/19	Lun 21/10/19	4	Management Team[5]	120 h	2 400,00€	
6			Risk analysis	3 jrs	Lun 21/10/19	Ven 25/10/19	5	Management Team[3]	72 h	1 440,00€	
7			Implementation ergonomic aspect: safety	2 jrs	Ven 25/10/19	Mar 29/10/19	6	Management Team[3]	48 h	960,00€	
8			Planning	3 jrs	Lun 21/10/19	Ven 25/10/19	5	Management Team[2]	48 h	960,00€	
9			Kick-off meeting	1 jr	Mar 29/10/19	Mer 30/10/19	6;8;7	Management Team[5]	40 h	800,00€	
10			Technical data sheet	3 jrs	Mer 30/10/19	Mar 05/11/19	9	Management Team[5]	120 h	2 400,00€	
11			**Study and classifications**	**22 jrs**	**Mar 05/11/19**	**Mar 10/12/19**			**1 272 h**	**19 280,00€**	

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Tâche		Récapitulatif inactif		Tâches externes	
Fractionnement		Tâche manuelle		Jalons externes	
Jalon		Durée uniquement		Échéance	
Récapitulative		Report récapitulatif manuel		Avancement	
Récapitulatif du projet		Récapitulatif manuel		Progression manuelle	
Tâche inactive		Début uniquement			
Jalon inactif		Fin uniquement			

N°		Mode Tâche	Nom de la tâche	Durée	Début	Fin	Prédécesseurs	Noms ressources	Travail	Coût	9 M J V S
12			Definition of the scope, references, manufacturing and logistics constraints	3 jrs	Mar 05/11/19	Ven 08/11/19	10	Engineers[7]	168 h	2 520,00€	
13			Analyzing and definition of the stakes	6 jrs	Ven 08/11/19	Mar 19/11/19	12	Engineers[3]	144 h	2 160,00€	
14			Identification of strengths, weaknesses, risks and threats	6 jrs	Ven 08/11/19	Mar 19/11/19	12	Engineers[4]	192 h	2 880,00€	
15			Quality definition	5 jrs	Mar 19/11/19	Mer 27/11/19	14;13	Engineers[7]	280 h	4 200,00€	
16			Definition of internal and/or external expertise	4 jrs	Mer 27/11/19	Mar 03/12/19	15	Engineers[7]	224 h	3 360,00€	
17			Define milestones	3 jrs	Mar 03/12/19	Lun 09/12/19	12;13;14;15	Engineers[7]	168 h	2 520,00€	
18			kick-off meeting study	1 jr	Lun 09/12/19	Mar 10/12/19	17	Engineers[7];Manager Team[5]	96 h	1 640,00€	

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Fractionnement	Tâche manuelle	Jalons externes	
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Récapitulatif du projet	Récapitulatif manuel	Progression manuelle	
Tâche inactive	Début uniquement		
Jalon inactif	Fin uniquement		

N°		Mode Tâche	Nom de la tâche	Durée	Début	Fin	Prédécesseurs	Noms ressources	Travail	Coût	9 M J V S
19			**Supply and manufacturing**	**42 jrs**	**Mar 10/12/19**	**Ven 14/02/20**			**1 984 h**	**20 320,00€**	
20			**Production line**	**42 jrs**	**Mar 10/12/19**	**Ven 14/02/20**			**992 h**	**10 160,00€**	
21			Purchase order of the machinery	2 jrs	Mar 10/12/19	Jeu 12/12/19	18	Engineers;Manageme Team	32 h	560,00€	
22			Reception and storage of machines	40 jrs	Jeu 12/12/19	Ven 14/02/20	21	Engineers;Technician[	960 h	9 600,00€	
23			**Network**	**42 jrs**	**Mar 10/12/19**	**Ven 14/02/20**			**992 h**	**10 160,00€**	
24			Purchase order of network equipments	2 jrs	Mar 10/12/19	Jeu 12/12/19	18	Management Team;Engineers	32 h	560,00€	
25			Reception and storage of network equipments	40 jrs	Jeu 12/12/19	Ven 14/02/20	24	Engineers;Technician[	960 h	9 600,00€	
26			**Pull List**	**5 jrs**	**Ven 14/02/20**	**Ven 21/02/20**			**560 h**	**8 800,00€**	
27			Kick-off meeting assembly	5 jrs	Ven 14/02/20	Ven 21/02/20	18;22;25	Management Team[5];Engineers[7];	560 h	8 800,00€	

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Récapitulatif du projet		Récapitulatif manuel		Progression manuelle	
Tâche inactive		Début uniquement			
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N°		Mode Tâche	Nom de la tâche	Durée	Début	Fin	Prédécesseurs	Noms ressources	Travail	Coût
28			**Assembly, Wiring**	**40 jrs**	**Lun 24/02/20**	**Lun 27/04/20**			**3 392 h**	**35 520,00€**
29			**Production line installation**	**26 jrs**	**Lun 24/02/20**	**Ven 03/04/20**			**2 128 h**	**21 960,00€**
30			Environment preparation	8 jrs	Lun 24/02/20	Ven 06/03/20	27	Engineers[4];Technicia	640 h	6 720,00€
31			Installation of the production line	14 jrs	Ven 06/03/20	Lun 30/03/20	30	Engineers[4];Technicia	1 232 h	12 600,00€
32			Unit testing of machines	4 jrs	Lun 30/03/20	Ven 03/04/20	31	Engineers[3];Technicia	256 h	2 640,00€
33			**Network installation**	**18 jrs**	**Lun 30/03/20**	**Lun 27/04/20**			**1 264 h**	**13 560,00€**
34			Environment preparation	4 jrs	Lun 30/03/20	Ven 03/04/20	31	Engineers[4];Technicia	288 h	3 120,00€
35			Installation of the network	10 jrs	Ven 03/04/20	Mar 21/04/20	34	Engineers[4];Technicia	720 h	7 800,00€
36			Unit testing of network	4 jrs	Mar 21/04/20	Lun 27/04/20	35	Engineers[3];Technicia	256 h	2 640,00€
37			**Tests**	**15 jrs**	**Lun 27/04/20**	**Mer 20/05/20**			**1 384 h**	**17 760,00€**

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Jalon inactif	Fin uniquement	

N°		Mode Tâche	Nom de la tâche	Durée	Début	Fin	Prédécesseurs	Noms ressources	Travail	Coût
38			Test of the installation	12 jrs	Lun 27/04/20	Ven 15/05/20	32;36	Engineers[7];Technicia	1 152 h	13 680,00 €
39			Technical approval	1 jr	Ven 15/05/20	Lun 18/05/20	38	Management Team[5];Engineers[7]	96 h	1 640,00 €
40			Top delivery meeting	1 jr	Lun 18/05/20	Mar 19/05/20	39	Management Team[5];Engineers[7]	96 h	1 640,00 €
41			Customer pre-reception	1 jr	Mar 19/05/20	Mer 20/05/20	40	Management Team[5]	40 h	800,00 €
42			**Delivery**	**1 jr**	**Mer 20/05/20**	**Jeu 21/05/20**			**8 h**	**120,00 €**
43			Production line locking	1 jr	Mer 20/05/20	Jeu 21/05/20	41	Engineers	8 h	120,00 €
44			**Team training**	**60,38 jrs**	**Ven 14/02/20**	**Mer 20/05/20**			**463 h**	**4 422,12 €**
45			Production line	5 jrs	Ven 14/02/20	Ven 21/02/20		Technician[7];HR	263 h	2 283,72 €
46			Network Installation	5 jrs	Ven 20/03/20	Sam 28/03/20	45	Technician[3];HR	160 h	1 519,20 €
47			Employee training	5 jrs	Mer 13/05/20	Mer 20/05/20	45;46	HR	40 h	619,20 €

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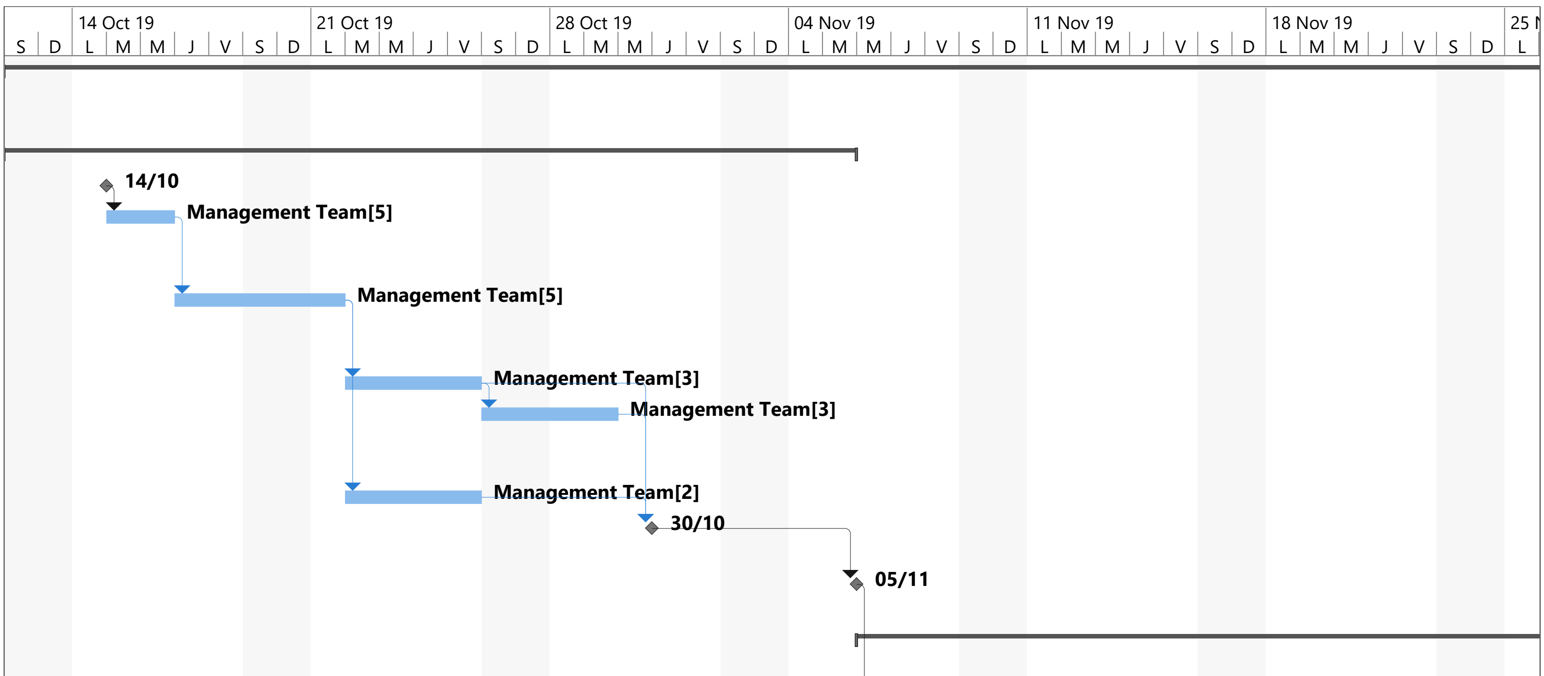

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Tâche	Récapitulatif inactif	Tâches externes
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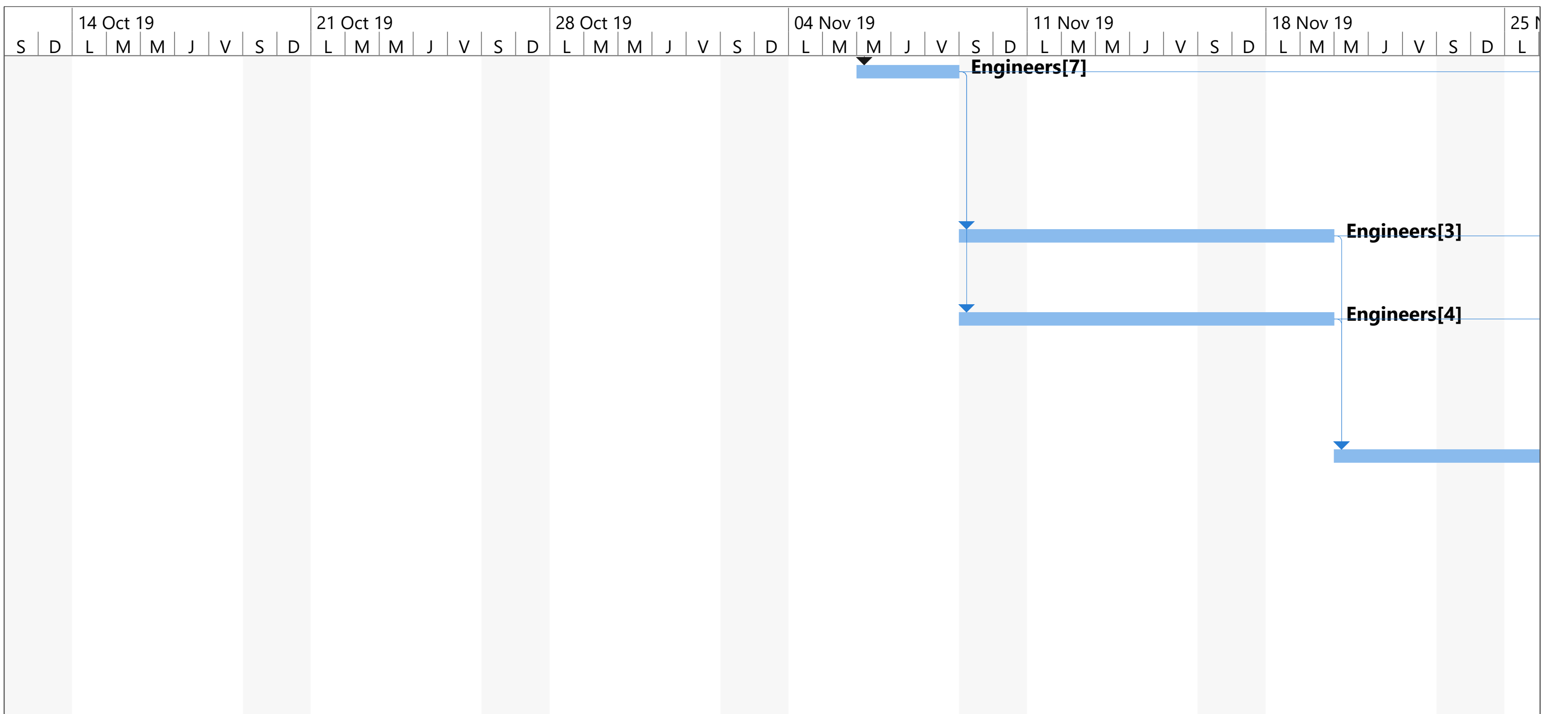

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Tâche	Récapitulatif inactif	Tâches externes
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Tâche inactive	Début uniquement	
Jalon inactif	Fin uniquement	

	14 Oct 19							21 Oct 19							28 Oct 19							04 Nov 19							11 Nov 19							18 Nov 19							25 N
S	D	L	M	M	J	V	S	D	L	M	M	J	V	S	D	L	M	M	J	V	S	D	L	M	M	J	V	S	D	L	M	M	J	V	S	D	L	M	M	J	V	S	D	L

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S D	L	M	M	J	V	S	D	L	M	M	J	V	S	D	L	M	M	J	V	S	D	L	M	M	J	V	S	D	L	M	M	J	V	S	D	L	M	M	J	V	S	D	L

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S	D	L	M	M	J	V	S	D	L	M	M	J	V	S	D	L	M	M	J	V	S	D	L	M	M	J	V	S	D	L	M	M	J	V	S	D	L	M	M	J	V	S	D	L

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Récapitulatif du projet		Récapitulatif manuel		Progression manuelle	
Tâche inactive		Début uniquement			
Jalon inactif		Fin uniquement			

Nov 19							02 Déc 19							09 Déc 19							16 Déc 19							23 Déc 19							30 Déc 19							06 Jan 20			
M	M	J	V	S	D		L	M	M	J	V	S	D	L	M	M	J	V	S	D	L	M	M	J	V	S	D	L	M	M	J	V	S	D	L	M	M	J	V	S	D	L	M	M	J

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Tâche		Récapitulatif inactif		Tâches externes	
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Jalon		Durée uniquement		Échéance	
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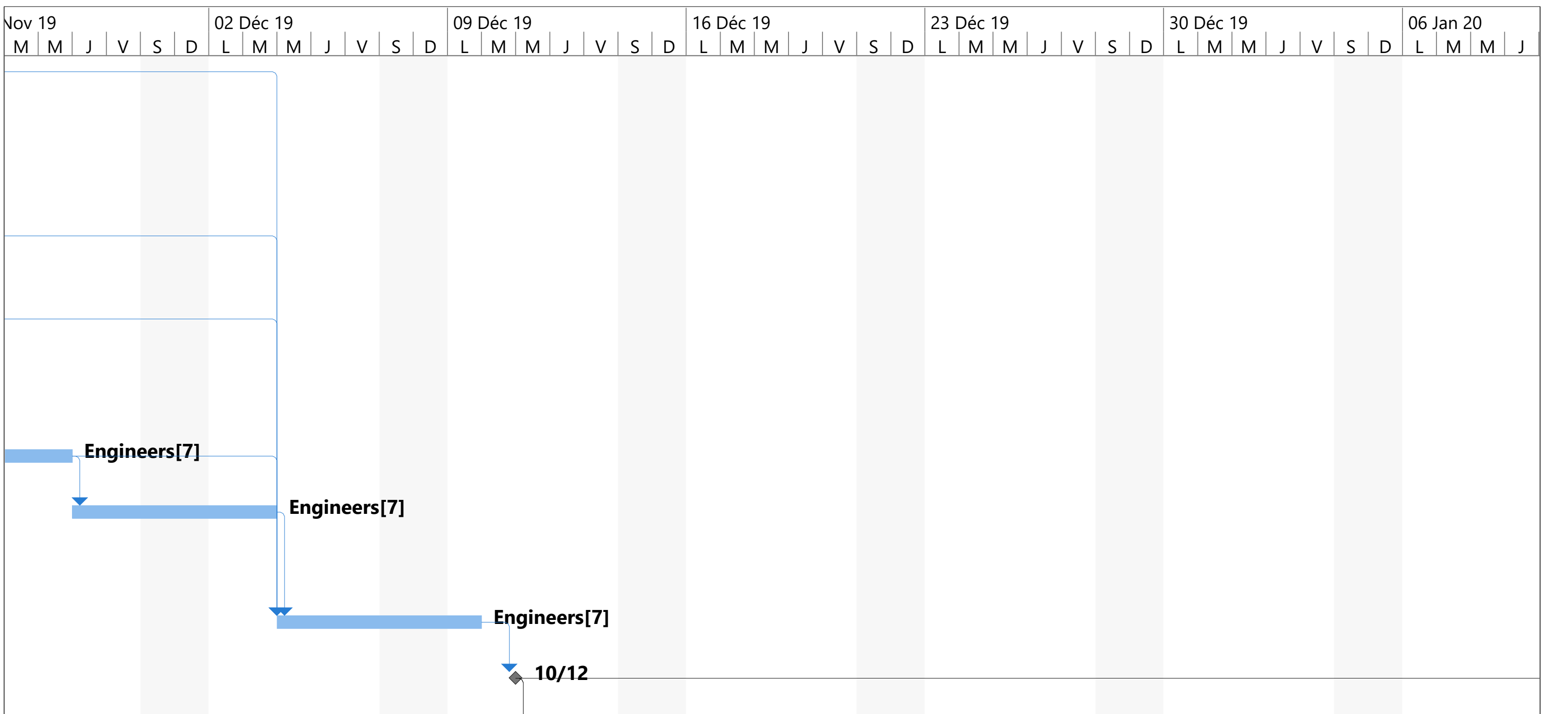
Tâche inactive		Début uniquement			
Jalon inactif		Fin uniquement			



Projet : Management_plan Date : Jeu 10/10/19	Tâche	Récapitulatif inactif	Tâches externes		
	Fractionnement	Tâche manuelle	Jalons externes		
	Jalon	Durée uniquement	Échéance		
	Récapitulative	Report récapitulatif manuel	Avancement		
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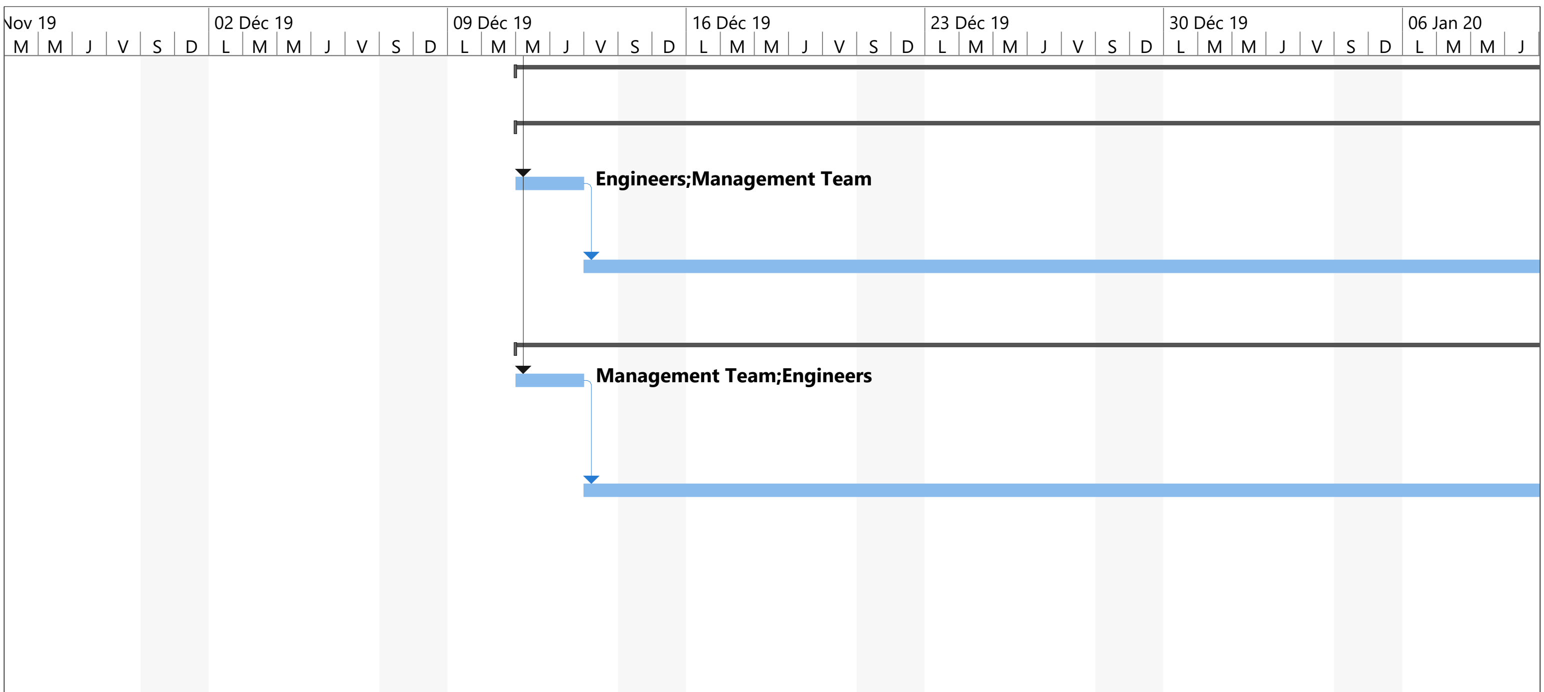

Projet : Management_plan Date : Jeu 10/10/19	Tâche	Récapitulatif inactif	Tâches externes
	Fractionnement	Tâche manuelle	Jalons externes
	Jalon	Durée uniquement	Échéance
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	Récapitulatif du projet	Récapitulatif manuel	Progression manuelle
	Tâche inactive	Début uniquement	
	Jalon inactif	Fin uniquement	

Nov 19						02 Déc 19							09 Déc 19							16 Déc 19							23 Déc 19							30 Déc 19							06 Jan 20			
M	M	J	V	S	D	L	M	M	J	V	S	D	L	M	M	J	V	S	D	L	M	M	J	V	S	D	L	M	M	J	V	S	D	L	M	M	J	V	S	D	L	M	M	J

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Tâche
Fractionnement
Jalon
Récapitulative
Récapitulatif du projet
Tâche inactive
Jalon inactif
Récapitulatif inactif
Tâche manuelle
Durée uniquement
Report récapitulatif manuel
Récapitulatif manuel
Début uniquement
Fin uniquement
Tâches externes
Jalons externes
Échéance
Avancement
Progression manuelle

Nov 19	02 Déc 19	09 Déc 19	16 Déc 19	23 Déc 19	30 Déc 19	06 Jan 20
M M J V S D	L M M J V S D	L M M J V S D	L M M J V S D	L M M J V S D	L M M J V S D	L M M J

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Tâche	Récapitulatif inactif	Tâches externes
Fractionnement	Tâche manuelle	Jalons externes
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Tâche inactive	Début uniquement	
Jalon inactif	Fin uniquement	

	13 Jan 20	20 Jan 20	27 Jan 20	03 Fév 20	10 Fév 20	17 Fév 20
V S D	L M M J V S D	L M M J V S D	L M M J V S D	L M M J V S D	L M M J V S D	L M M J V S D

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	13 Jan 20							20 Jan 20							27 Jan 20							03 Fév 20							10 Fév 20							17 Fév 20						
V	S	D	L	M	M	J	V	S	D	L	M	M	J	V	S	D	L	M	M	J	V	S	D	L	M	M	J	V	S	D	L	M	M	J	V	S	D	L	M	M	J	V	S	D

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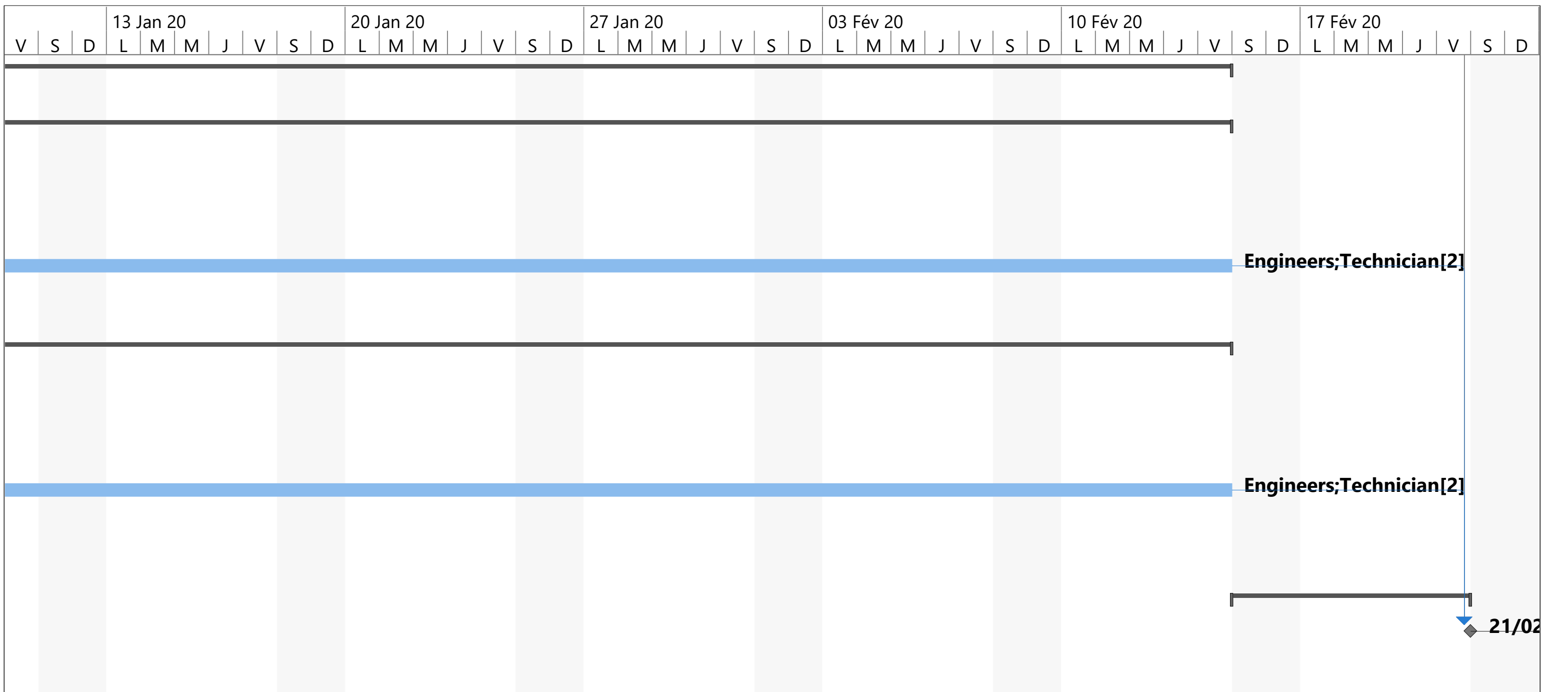

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	13 Jan 20	20 Jan 20	27 Jan 20	03 Fév 20	10 Fév 20	17 Fév 20
V S D	L M M J V S D	L M M J V S D	L M M J V S D	L M M J V S D	L M M J V S D	L M M J V S D

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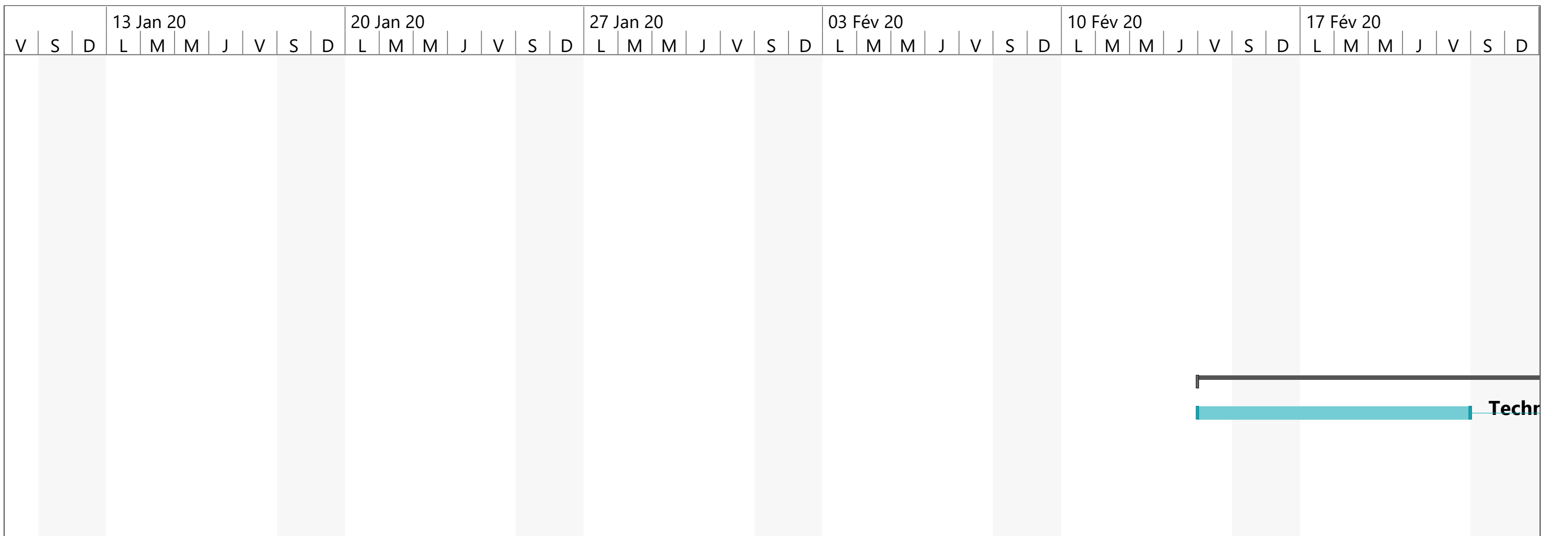

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Tâche inactive		Début uniquement			
Jalon inactif		Fin uniquement			

24 Fév 20	02 Mar 20	09 Mar 20	16 Mar 20	23 Mar 20	30 Mar 20	06 Avr 20
L M M J V S D	L M M J V S D	L M M J V S D	L M M J V S D	L M M J V S D	L M M J V S D	L M M

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24 Fév 20							02 Mar 20							09 Mar 20							16 Mar 20							23 Mar 20							30 Mar 20							06 Avr 20		
L	M	M	J	V	S	D	L	M	M	J	V	S	D	L	M	M	J	V	S	D	L	M	M	J	V	S	D	L	M	M	J	V	S	D	L	M	M	J	V	S	D	L	M	M

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24 Fév 20							02 Mar 20							09 Mar 20							16 Mar 20							23 Mar 20							30 Mar 20							06 Avr 20		
L	M	M	J	V	S	D	L	M	M	J	V	S	D	L	M	M	J	V	S	D	L	M	M	J	V	S	D	L	M	M	J	V	S	D	L	M	M	J	V	S	D	L	M	M

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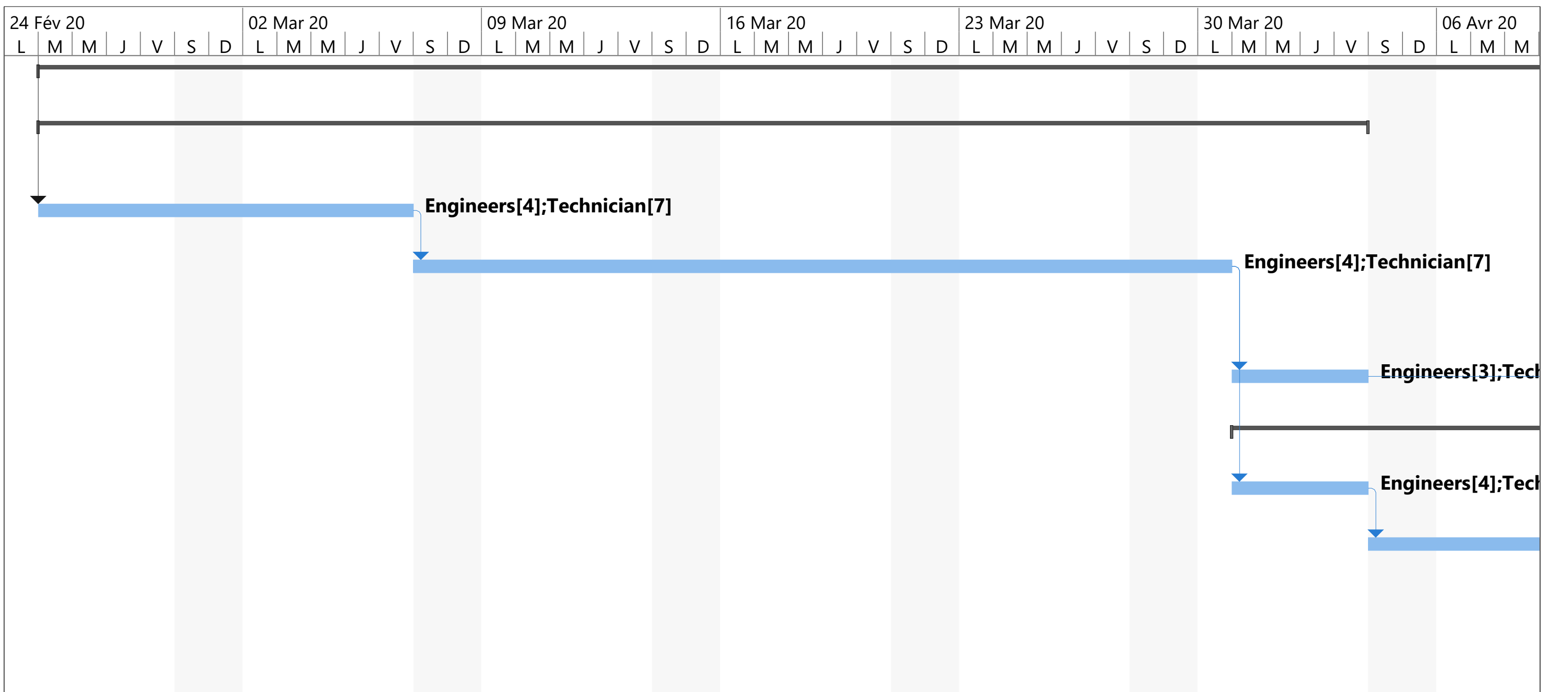
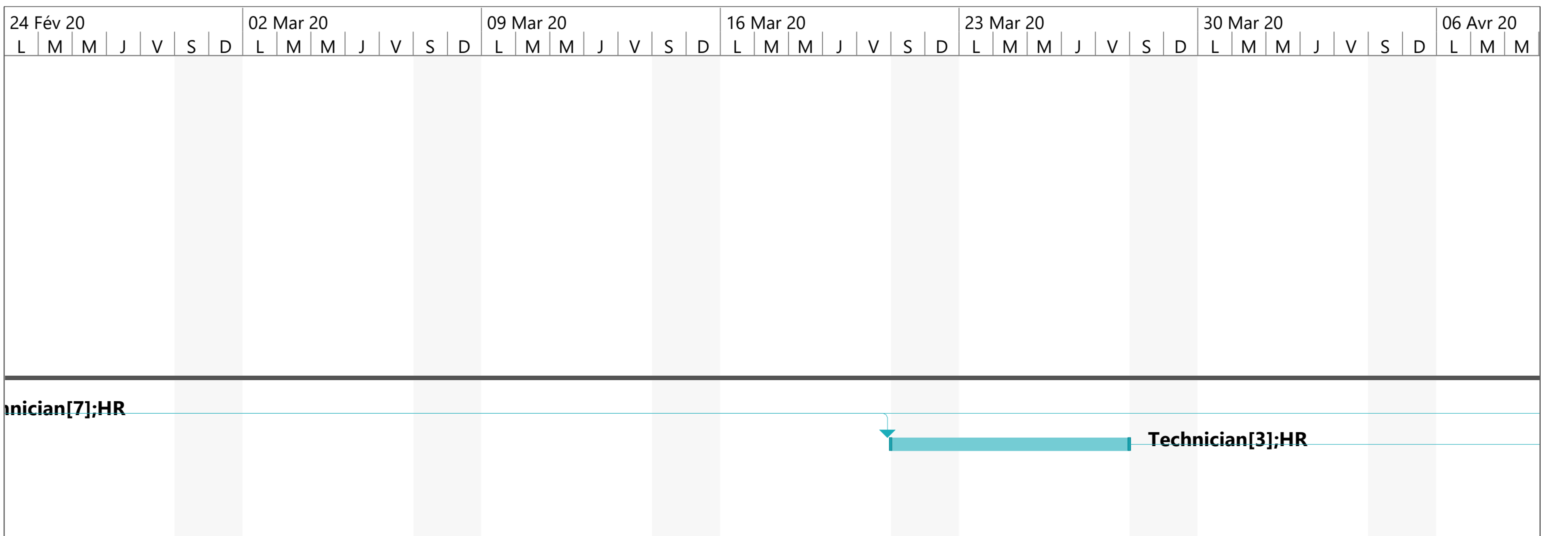
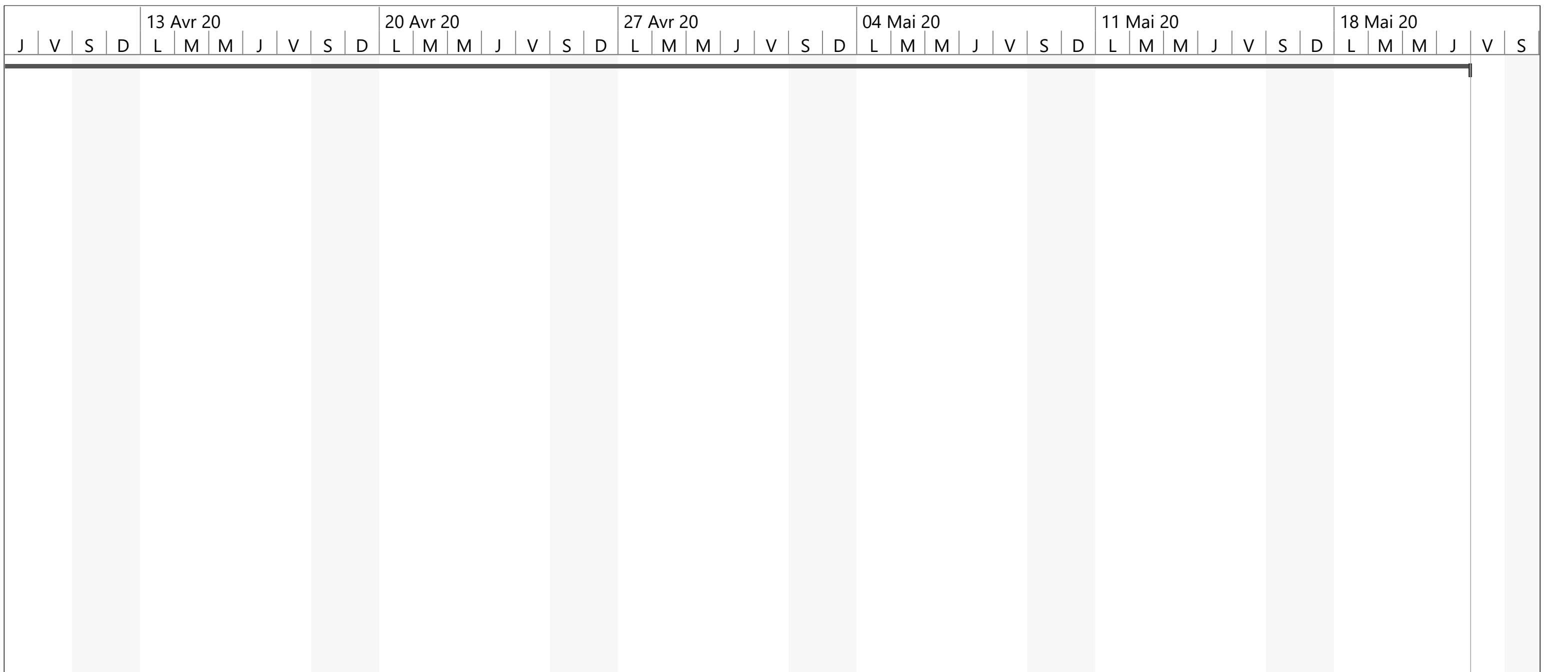


Projet : Management_plan Date : Jeu 10/10/19	Tâche		Récapitulatif inactif		Tâches externes	
	Fractionnement		Tâche manuelle		Jalons externes	
	Jalon		Durée uniquement		Échéance	
	Récapitulative		Report récapitulatif manuel		Avancement	
	Récapitulatif du projet		Récapitulatif manuel		Progression manuelle	
	Tâche inactive		Début uniquement			
	Jalon inactif		Fin uniquement			



Projet : Management_plan Date : Jeu 10/10/19	Tâche	Récapitulatif inactif	Tâches externes
	Fractionnement	Tâche manuelle	Jalons externes
	Jalon	Durée uniquement	Échéance
	Récapitulative	Report récapitulatif manuel	Avancement
	Récapitulatif du projet	Récapitulatif manuel	Progression manuelle
	Tâche inactive	Début uniquement	
	Jalon inactif	Fin uniquement	



Projet : Management_plan Date : Jeu 10/10/19	Tâche	Récapitulatif inactif	Tâches externes
	Fractionnement	Tâche manuelle	Jalons externes
	Jalon	Durée uniquement	Échéance
	Récapitulative	Report récapitulatif manuel	Avancement
	Récapitulatif du projet	Récapitulatif manuel	Progression manuelle
	Tâche inactive	Début uniquement	
	Jalon inactif	Fin uniquement	

	13 Avr 20	20 Avr 20	27 Avr 20	04 Mai 20	11 Mai 20	18 Mai 20
J V S D	L M M J V S D	L M M J V S D	L M M J V S D	L M M J V S D	L M M J V S D	L M M J V S

Projet : Management_plan
Date : Jeu 10/10/19

Tâche	Récapitulatif inactif	Tâches externes
Fractionnement	Tâche manuelle	Jalons externes
Jalon	Durée uniquement	Échéance
Récapitulative	Report récapitulatif manuel	Avancement
Récapitulatif du projet	Récapitulatif manuel	Progression manuelle
Tâche inactive	Début uniquement	
Jalon inactif	Fin uniquement	

	13 Avr 20	20 Avr 20	27 Avr 20	04 Mai 20	11 Mai 20	18 Mai 20
J V S D	L M M J V S D	L M M J V S D	L M M J V S D	L M M J V S D	L M M J V S D	L M M J V S

Projet : Management_plan
Date : Jeu 10/10/19

Tâche	Récapitulatif inactif	Tâches externes
Fractionnement	Tâche manuelle	Jalons externes
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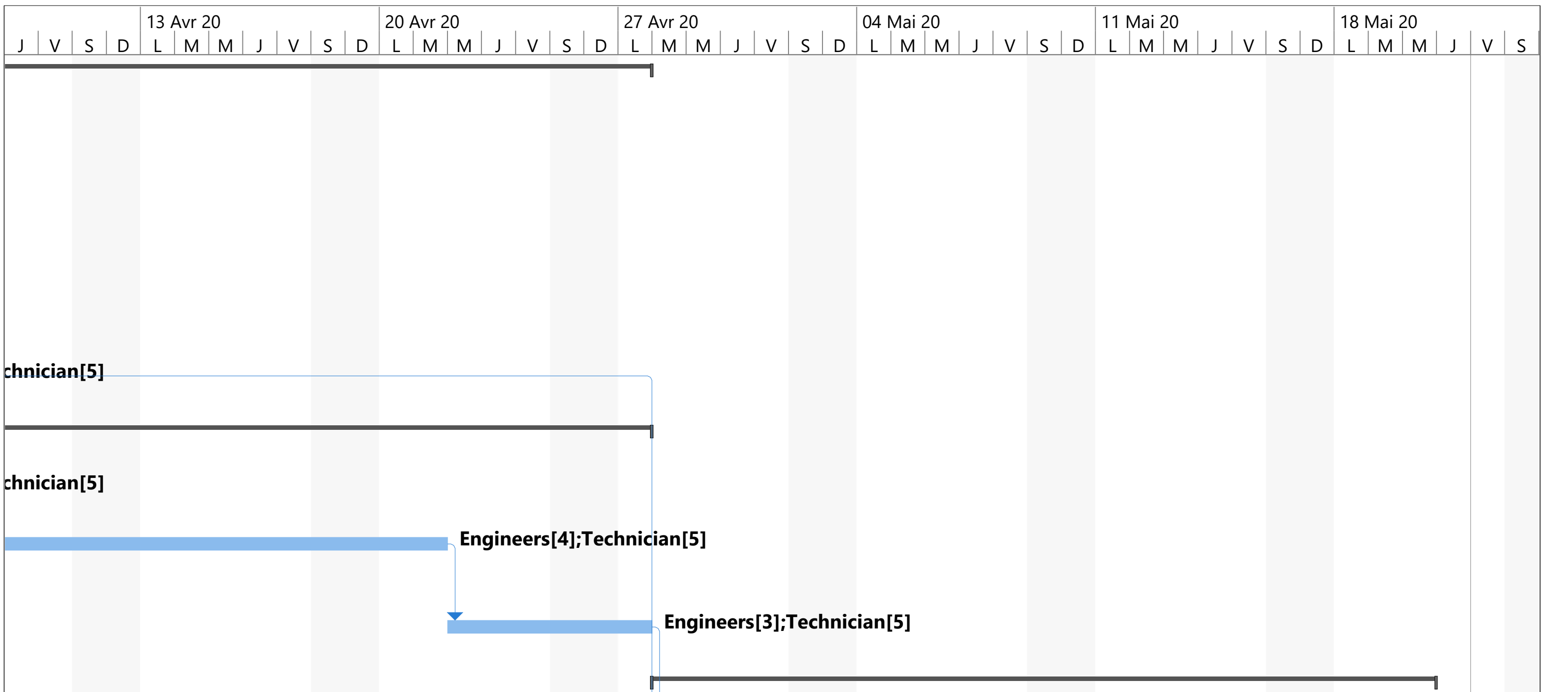
Récapitulative	Report récapitulatif manuel	Avancement
Récapitulatif du projet	Récapitulatif manuel	Progression manuelle
Tâche inactive	Début uniquement	
Jalon inactif	Fin uniquement	



Projet : Management_plan
Date : Jeu 10/10/19

Tâche	Récapitulatif inactif	Tâches externes
Fractionnement	Tâche manuelle	Jalons externes
Jalon	Durée uniquement	Échéance
Récapitulative	Report récapitulatif manuel	Avancement
Récapitulatif du projet	Récapitulatif manuel	Progression manuelle
Tâche inactive	Début uniquement	
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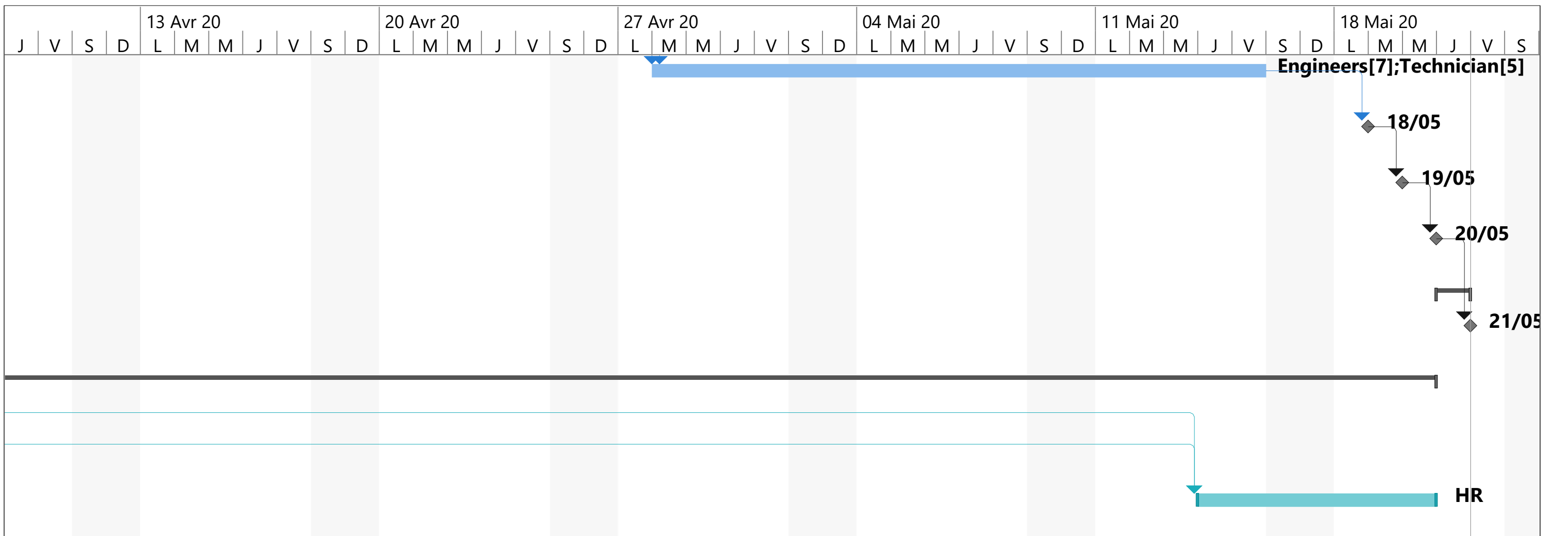

Tâche		Récapitulatif inactif		Tâches externes	
Fractionnement		Tâche manuelle		Jalons externes	
Jalon		Durée uniquement		Échéance	
Récapitulative		Report récapitulatif manuel		Avancement	
Récapitulatif du projet		Récapitulatif manuel		Progression manuelle	
Tâche inactive		Début uniquement			
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