



InCUBE
sustainable building innovations

WP5

WINER

User Manual

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Executive Summary

This manual is designed so that the user using the WINER tool is able to see the workflow of the tool, and to facilitate its use.

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List of Acronyms and Abbreviations

Term	Description
WINER	Workflow INtegrator and optimizER
LCP	Lean Construction Platform
JSO	Job Scheduling Optimizer

1 Introduction

1.1 Objective of this manual

The purpose of this document is to explain to the user how to use the WINER tool, a tool developed within the InCUBE project, which is responsible for optimizing the renovation activities of a building in terms of time, cost and safety.

InCUBE WINER was built upon Lean Construction Platform (LCP) and Job Scheduling Optimizer (JSO) modules by CIRCE and CERTH respectively to facilitate the supervision and optimization of the whole lifecycle of the building renovation process, by indicating the optimal renovation actions sequence, in terms of time and cost efficiency, construction site safety, waste management, occupant disturbance, enabling the automation of quality assurance processes at all stages of the renovation process.

1.2 Manual audience

This manual is mainly designed for the primary partners involved in the InCUBE project who are responsible for the planning and coordination of building renovation works. These partners are Metro7 for the Spanish demosite, Fondazione Bruno Kessler for the Italian demosite, and VanWijnen for the Dutch demosite.

In addition, this manual is intended to serve as a resource for any other members of the project, who is interested in knowing how the WINER tool works.

1.3 Tool benefits

The tool offers multiple benefits to the user, highlighting its ability to optimize the sequence of activities in a building renovation process based on safety, time and costs, taking into account the waste generated and the tenant disturbance. This optimization allows for more efficient and effective planning, reducing delays, minimizing unnecessary costs and improving safety conditions on site.

In addition, the tool incorporates an educational approach by allowing users to learn and apply Lean techniques, which not only improves project management, but can also contribute to a significant increase in the site safety score, promoting a safer and more professional working environment.

2 Prerequisites

2.1 Compatible browsers

WINER is a web-based system developed by CIRCE that allows users to enter the activities and tasks of the renovation process, receive optimized planning of these activities from JSO and LCP tools and visualize the results in an interactive Gantt chart.

As a web tool, it is compatible with the following browsers: Google Chrome (version 100 or higher), Mozilla Firefox (version 95 or higher), Microsoft Edge (version 96 or higher) and Safari (version 14 or higher). To ensure optimal performance, we recommend that you use the latest version of your preferred browser. Proper operation is not guaranteed on outdated or beta browsers.

2.2 User account

Access to the tool is made directly from its web interface. To enter, it will be necessary to have unique credentials (username and password), which will be provided by CIRCE. These credentials are personal and non-transferable and are intended to guarantee secure and personalised access to the tool.

2.3 Information requested from the user

When users first access the WINER web application, they are required to complete three essential questionnaires to provide the LCP and JSO tools with the necessary information for optimization: the company questionnaire, the activity questionnaire, and the Lean recommendations questionnaire.



Figure 1 WINER main page

Company Questionnaire: This questionnaire gathers relevant information about the different companies involved in carrying out the project activities. It captures details such as company names, contact information, and areas of expertise.

Activity Questionnaire: This questionnaire allows users to enter specific details for each activity, including the companies involved, the tasks assigned, and the location (indoor or outdoor) and type of task. Each activity can have multiple associated tasks. This information is utilized by the JSO and LCP tools to optimize the project schedule based on time and cost considerations. Tasks correspond to jobs and activities to work packages according to the nomenclature used in the JSO. **Important!** This questionnaire will be disabled until the previous one is completed, so that it is possible to associate the companies to the corresponding task. On the other hand, the registered companies can be modified even if the activity questionnaire has already been started.

Lean Recommendations Questionnaire: This questionnaire assesses the current status of the project with respect to Lean principles. It asks questions about various aspects of the project, such as safety measures, waste reduction, and workflow efficiency. Based on the responses of the user, the questionnaire provides Lean recommendations for improvement in areas where deficiencies are identified. Additionally, it assigns a risk factor associated with the current state of the project, which is used by the LCP tool as a variable in calculating the *Safety Score* of the activity schedule.

Lean Quiz: WINER offers an optional questionnaire that provides more general Lean recommendations. While the responses to this questionnaire are not directly used by the optimization tools, they provide valuable insights into the project and offer suggestions for overall improvement.

The following section provides a step-by-step guide with images to illustrate the use of the WINER tool.

3 User guide

3.1 Login

As mentioned in Section 2.2, to access the web tool, the user must log in using the credentials provided by CIRCE in advance. These credentials, consisting of a username and password, are unique for each user and ensure secure access to the system.

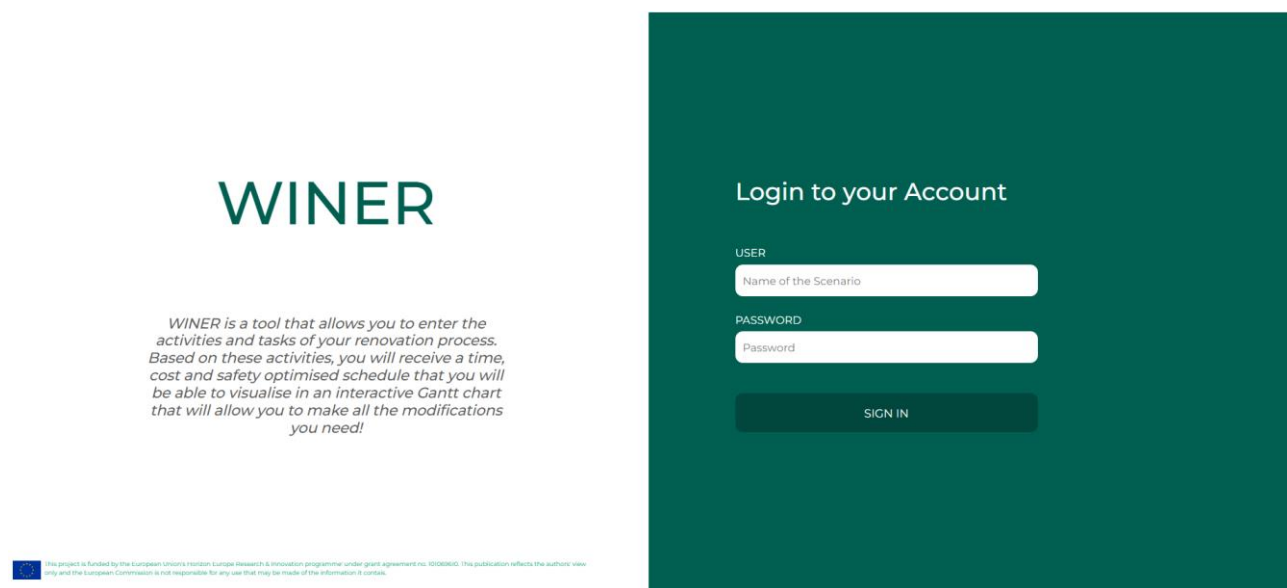


Figure 2 Login page

On the login screen, the user will enter the username and password in the appropriate fields and click the “SIGN IN” button.

Once the user has logged in, he/she will access the main page shown in Figure 1.

3.2 How to create a company

Once the user has logged in, the first step is to complete the company information. This form is designed to collect key information on all companies involved in your building renovation activities.



Figure 3 Companies questionnaire

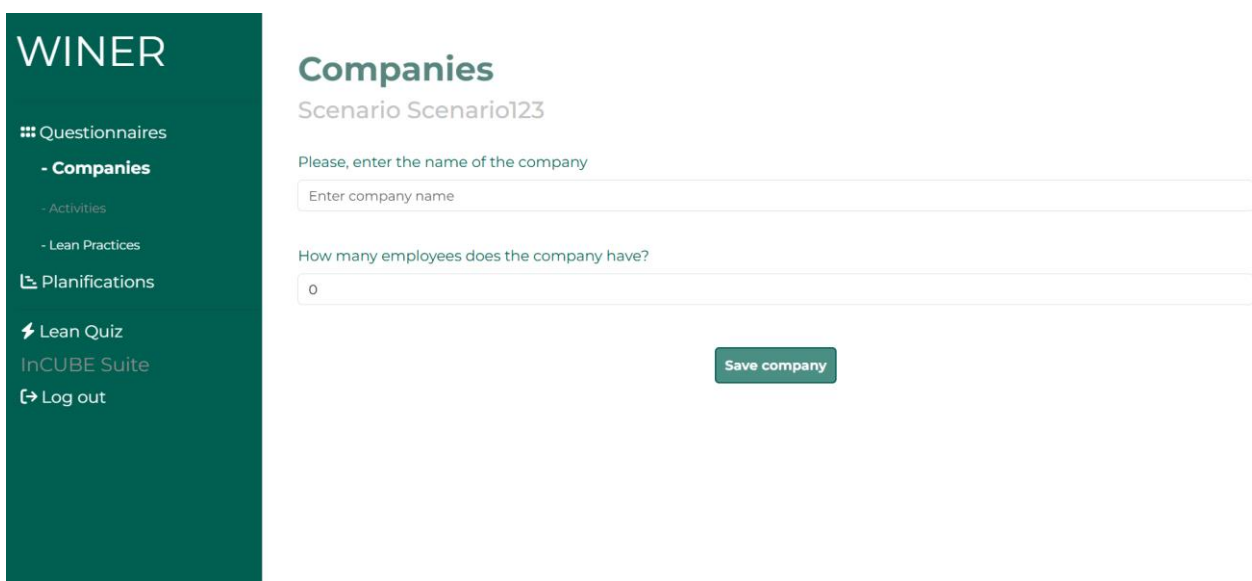


Figure 4 Information required for the company's questionnaire

In the questionnaire, the user will need to provide the name of each company and the total number of employees it has. This first questionnaire will be required to enable the activities questionnaire.

Once the questionnaire is completed, the user will be able to view and modify all registered companies.

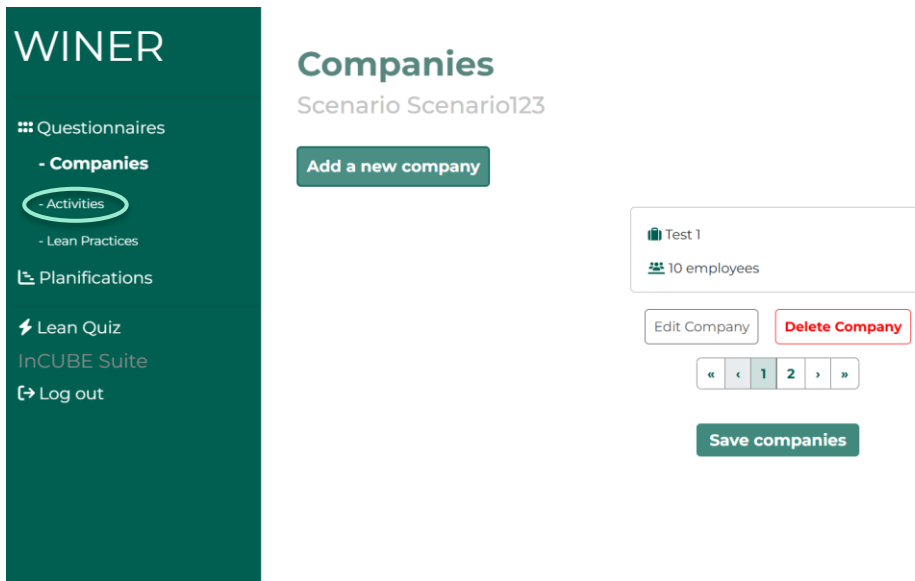


Figure 5 Registered company

As can be seen in the menu on the left side of the screen, the activities questionnaire is now enabled.

3.3 How to create activities and tasks

The activity questionnaire begins by entering a date that corresponds to the start date of the activity. Once the date is set, the tasks that make up each activity are defined. It is possible to create as many activities and tasks as necessary to reflect the complete renovation works.



Figure 6 Create activity page



Figure 7 Define tasks button

For each task, several questions must be completed, including the name of the task, a detailed description and other related fields that will be indicated in the questionnaire. It is important to provide accurate information to ensure that the tool can manage activities effectively. It should be noted that, within the activity questionnaire, it will be possible to define the dependencies that tasks have on each other, indicating that these must be completed before the current one can begin.

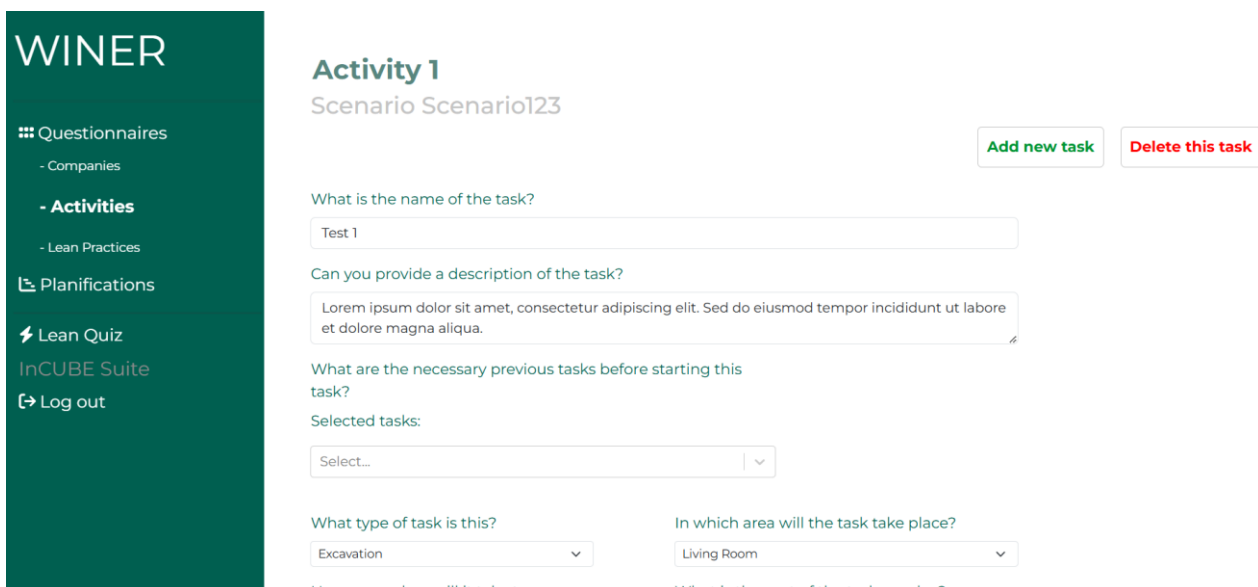


Figure 8 Task questionnaire

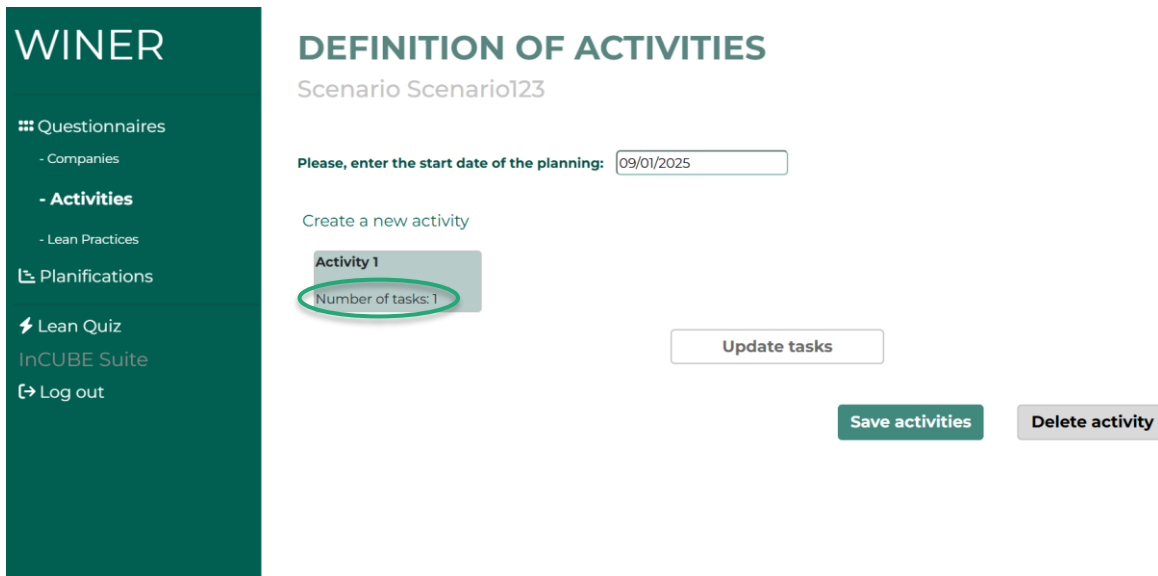


Figure 9 Activities main page with a task defined

The interface allows activities and tasks to be added, edited or deleted at any time, making it easy to adapt the planning to the user's needs.

3.4 Lean Practices questionnaire

Finally, the last questionnaire that the user will find is the Lean questionnaire. This questionnaire is designed to evaluate how certain key concepts of the Lean methodology are applied in the user's activities. In this questionnaire, different concepts related to process optimization and process execution will be presented. For each concept, the user will be asked to assign a score on a scale of 0 to 10, where 0 indicates that the concept is not applied at all and 10 indicates optimal application.

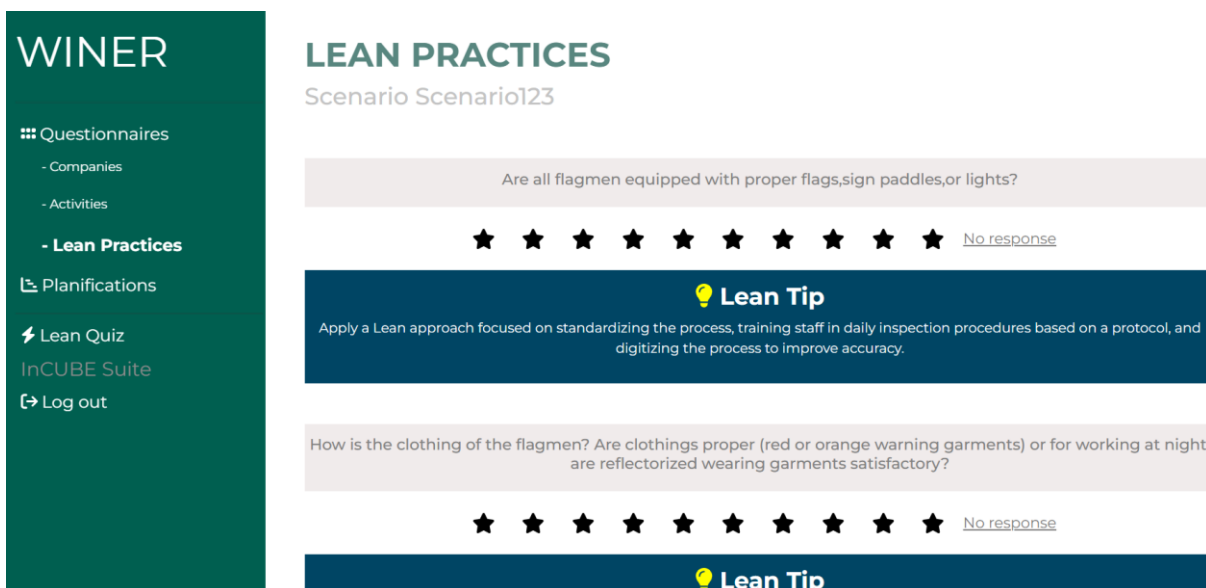


Figure 10 Lean practices questionnaire

Once the questionnaire has been completed, the tool will analyze the answers and provide personalized advice from the Lean approach. This advice will be oriented to improve the implementation of the evaluated concepts and to identify areas of opportunity to optimize the user's activities and processes.

3.5 Optimization results

This section presents the main output of the tool: two automatically generated Gantt charts. The first shows the activities optimized based on time and cost, while the second optimizes them on the basis of safety. Both diagrams include key information such as the total duration of the activities, the estimated cost, the safety score and the percentage of disruption to tenants.

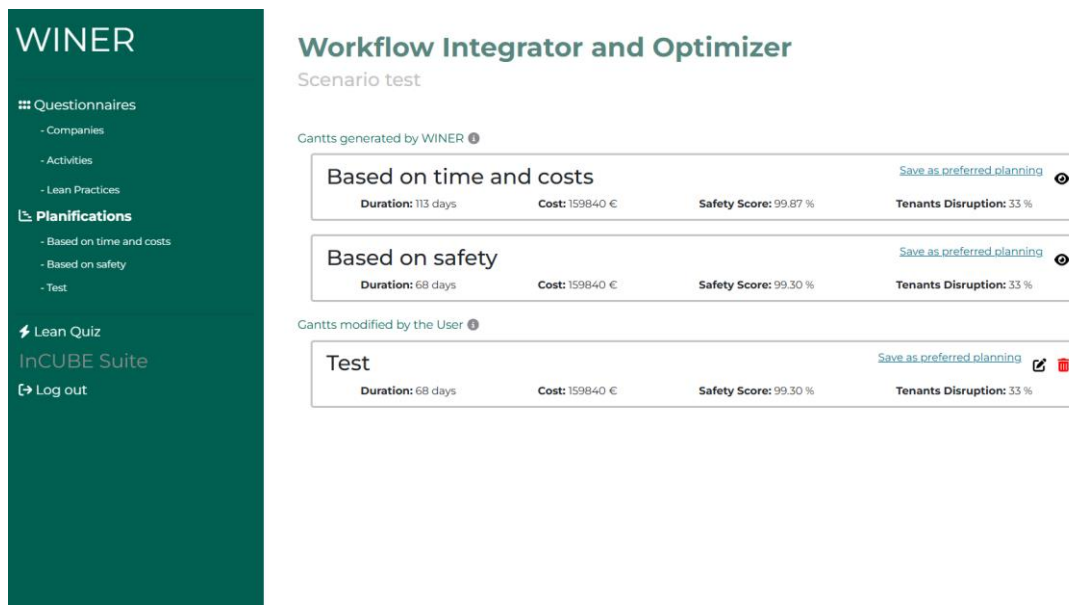


Figure 11 Planifications main page

The user can access each schedule by selecting the eye button and view it at different levels of detail: monthly, daily and hourly view. In addition, within each activity, the list of associated tasks can be displayed to review their distribution and content.

WINER

- Questionnaires
 - Companies
 - Activities
 - Lean Practices
- Planifications
 - Based on time and costs
 - Based on safety
 - Test
- Lean Quiz

InCUBE Suite

Log out

Workflow Integrator and Optimizer

Scenario test

Gantt generated by WINER

Based on time and costs			
Duration: 113 days	Cost: 159840 €	Safety Score: 99.87 %	Tenants Disruption: 33 %

Based on safety			
Duration: 68 days	Cost: 159840 €	Safety Score: 99.30 %	Tenants Disruption: 33 %

Gantt modified by the User

Test			
Duration: 68 days	Cost: 159840 €	Safety Score: 99.30 %	Tenants Disruption: 33 %

Figure 12 Eye button for accessing the Gantt

Additionally, the user can designate one of the plans as the primary scenario plan by clicking the "Save as preferred planning" button and confirming the action by selecting "Yes, confirm" in the resulting pop-up. Once confirmed, the selected plan will be highlighted to indicate it as the primary one.

WINER

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InCUBE Suite

Log out

Workflow Integrator and Optimizer

Scenario test

Gantt generated by WINER

Based on time and costs			
Duration: 113 days	Cost: 159840 €	Safety Score: 99.87 %	Tenants Disruption: 33 %

Based on safety			
Duration: 68 days	Cost: 159840 €	Safety Score: 99.30 %	Tenants Disruption: 33 %

Gantt modified by the User

Test			
Duration: 69 days	Cost: 159840 €	Safety Score: 95.52 %	Tenants Disruption: 33 %

Figure 13 Preferred planning selected

To change the primary plan to a different one, simply repeat the process: click the "Save as preferred planning" button for the desired plan and confirm the selection by pressing "Yes, confirm" in the pop-up.

If the user wishes to customize the schedule, an editable version of any of the generated diagrams can be created by selecting the “Create editable Gantt copy” option, as showed in Figure 14. This allows the activities and tasks to be modified according to the user's specific needs, facilitating a planning adjusted to the particular circumstances of the project. The user-modified schedule will appear on the main screen, under 'Gantt modified by the User'.

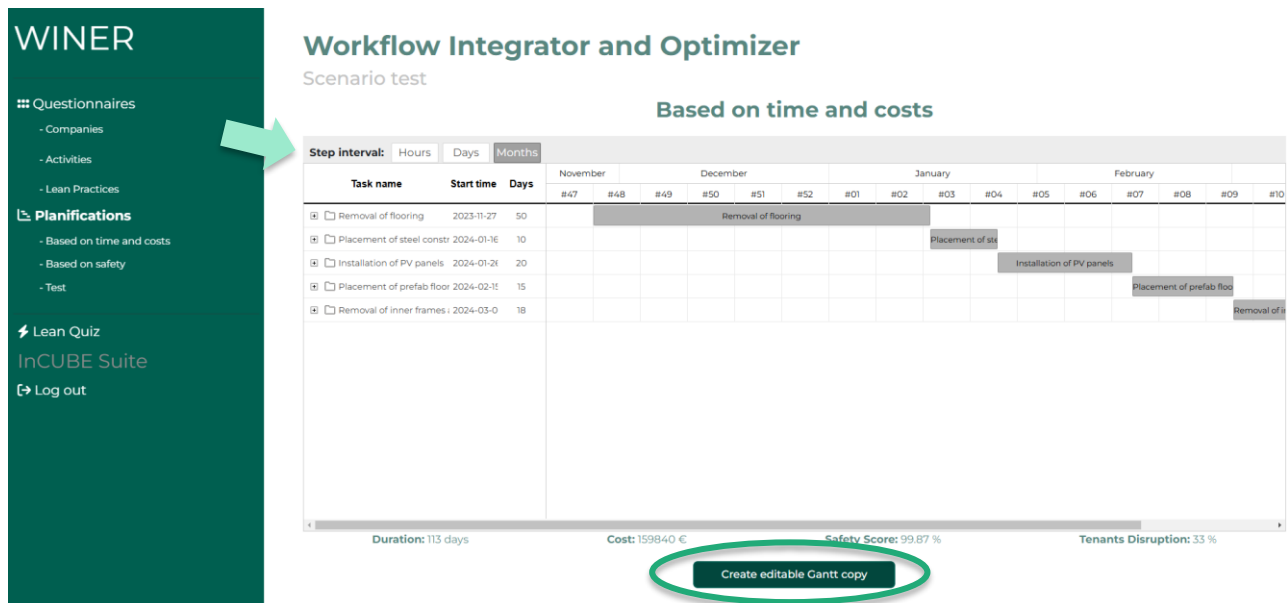


Figure 14 Gantt generated by WINER

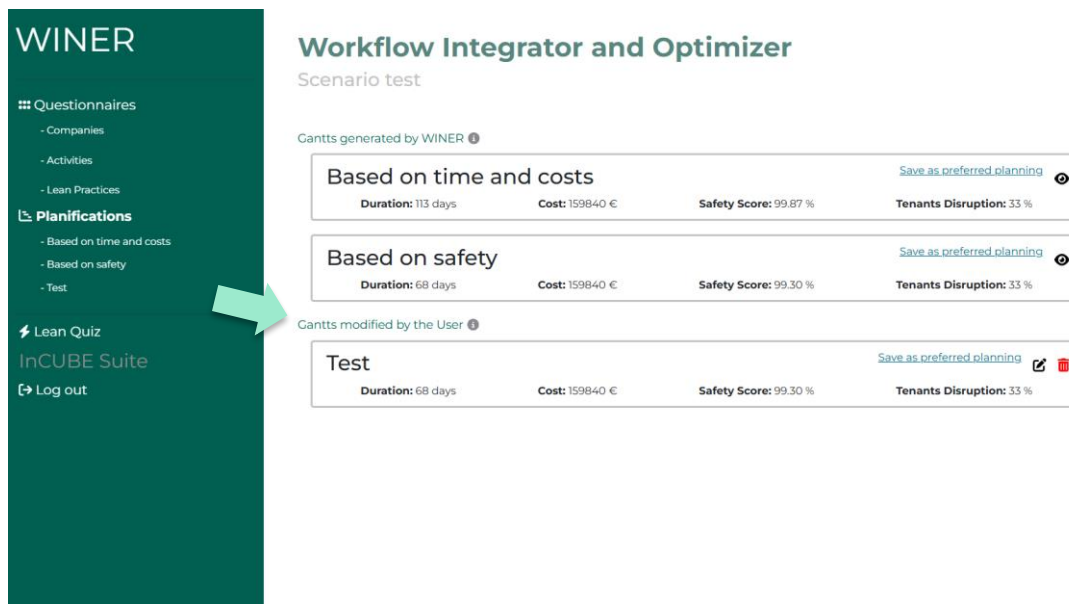


Figure 15 Gantt modified by the user

In case the User wants to edit a task that depends on another one, the tool will show the following warning pop-up:

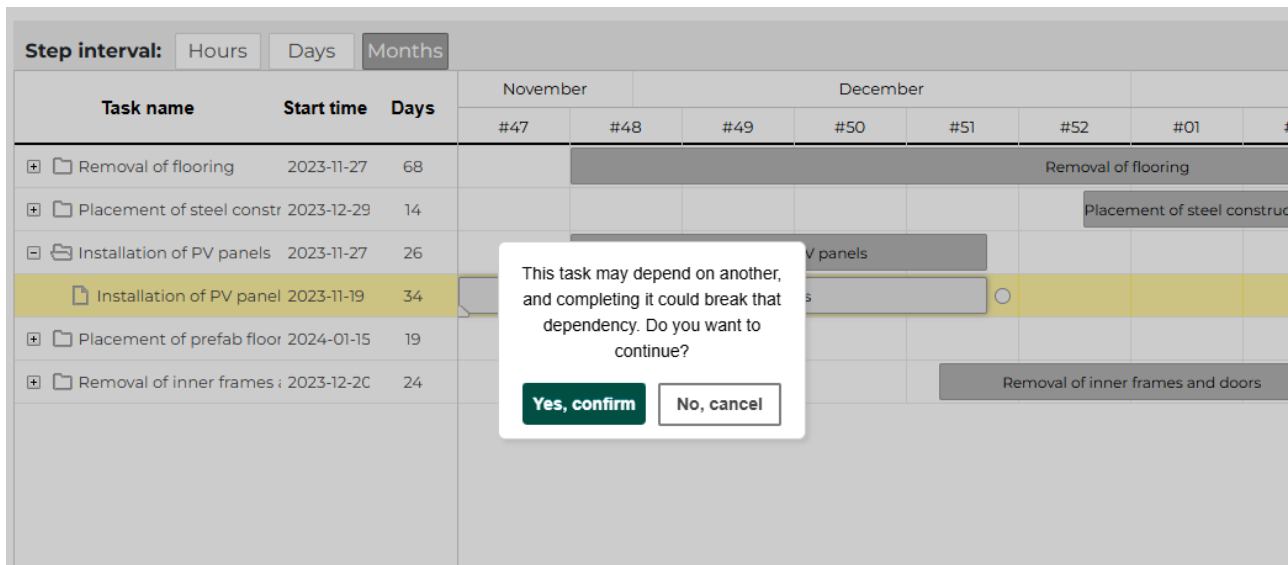


Figure 16 Warning of dependency between tasks

3.6 Lean Quiz

In addition to the initial Lean questionnaire, the user has at his disposal the Lean Quiz, a tool designed to evaluate the degree of application of the Lean methodology in his/her renovation work. This questionnaire consists of a series of Yes/No questions, allowing the user to identify the level of alignment of current practices with Lean principles.

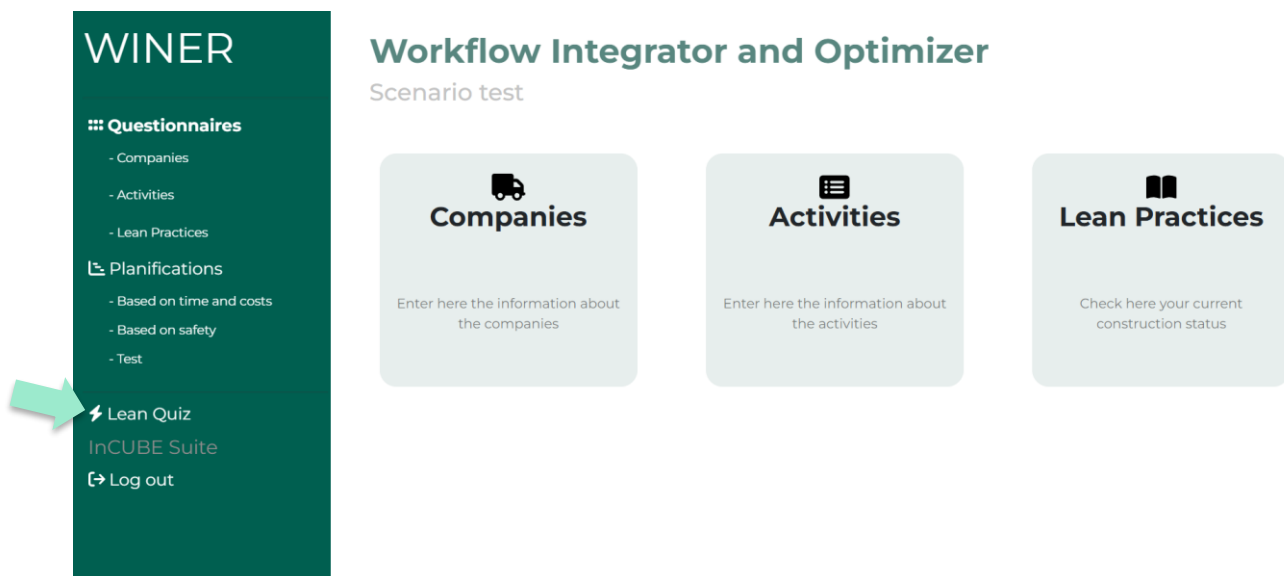
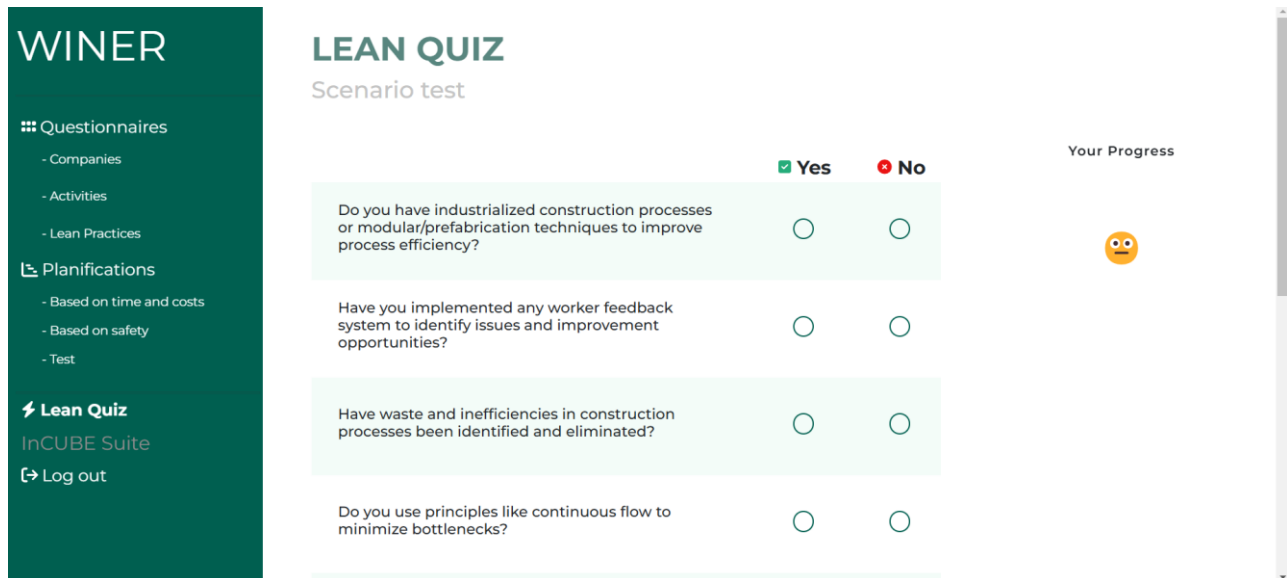


Figure 17 WINER main page

As the user progresses through the questions, the system displays a progress indicator along with a representative emoji that reflects, in a visual and user-friendly way, how well the Lean methodology

is being applied. This provides immediate feedback and helps to quickly identify areas for improvement.



WINER

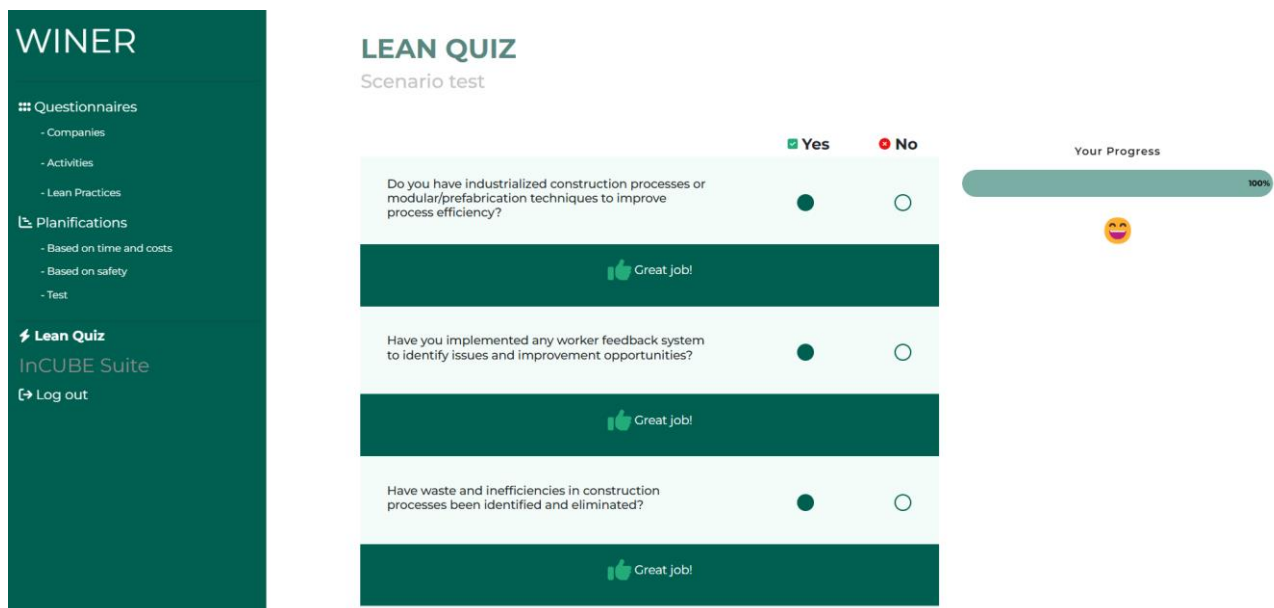
- Questionnaires
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 - Lean Practices
- Planifications
 - Based on time and costs
 - Based on safety
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- InCUBE Suite
- Log out

LEAN QUIZ
Scenario test

	Yes	No
Do you have industrialized construction processes or modular/prefabrication techniques to improve process efficiency?	☐	☐
Have you implemented any worker feedback system to identify issues and improvement opportunities?	☐	☐
Have waste and inefficiencies in construction processes been identified and eliminated?	☐	☐
Do you use principles like continuous flow to minimize bottlenecks?	☐	☐

Your Progress: 0% (neutral face emoji)

Figure 18 Lean Quiz



WINER

- Questionnaires
 - Companies
 - Activities
 - Lean Practices
- Planifications
 - Based on time and costs
 - Based on safety
 - Test
- Lean Quiz**
- InCUBE Suite
- Log out

LEAN QUIZ
Scenario test

	Yes	No
Do you have industrialized construction processes or modular/prefabrication techniques to improve process efficiency?	☒	☐
Have you implemented any worker feedback system to identify issues and improvement opportunities?	☒	☐
Have waste and inefficiencies in construction processes been identified and eliminated?	☒	☐

Your Progress: 100% (happy face emoji)

Great job!

Figure 19 Answered Lean Quiz

In addition, if the user answers No to any of the questions, suggestions on how to improve that aspect will be provided:

WINER

- Questionnaires
 - Companies
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 - Lean Practices
- Planifications
 - Based on time and costs
 - Based on safety
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InCUBE Suite

Log out

LEAN QUIZ

Scenario test

Yes

No

Do you have industrialized construction processes or modular/prefabrication techniques to improve process efficiency?

Explore opportunities to use prefabricated and modular components, assess the economic and technical viability of these techniques in specific projects. These techniques bring numerous benefits, such as time and planning efficiency, leading to cost reduction, greater precision, and coordination in planning.

Have you implemented any worker feedback system to identify issues and improvement opportunities?

Create communication channels for workers to contribute their ideas and concerns, conduct job satisfaction surveys, and seek opportunities to address issues. Recognize and reward workers' contributions to process improvement. These actions enable early problem identification, waste reduction, and promote a culture of continuous improvement.

Have waste and inefficiencies in construction processes been identified and eliminated?

Your Progress

100%

😊

Figure 20 Lean suggestions

4 Problem solvings/FAQs

Why can't I edit the Gantt for Based on time and costs and based on safety?

These schedules are automatically generated by the tool, as are the optimised schedules based on these variables. In order to edit a Gantt, you will have to create one based on one of the Gantt generated by the tool.

Why can't I edit the activities of a Gantt?

Only tasks are edited, and the activities are reorganised according to their tasks.

How can I edit the name of an activity?

By clicking on the name of the activity in your questionnaire.

Can I leave the 'previous tasks' field empty?

Yes, this field is optional.

If I can't access the activity questionnaire, what should I do?

This happens because the company questionnaire must first be completed. In other words, to start filling out the activity questionnaire, at least one company must be created.

What happens if I delete a company that has an associated task?

If you delete a company that has an associated task, a red triangle will appear in the activity questionnaire to warn you about the issue. To resolve it, you'll need to access the activity questionnaire that contains the task and select another existing company.

Once I have answered the Lean Practices form and hit the save questions button, can I answer it again?

No, you can only answer it once.