

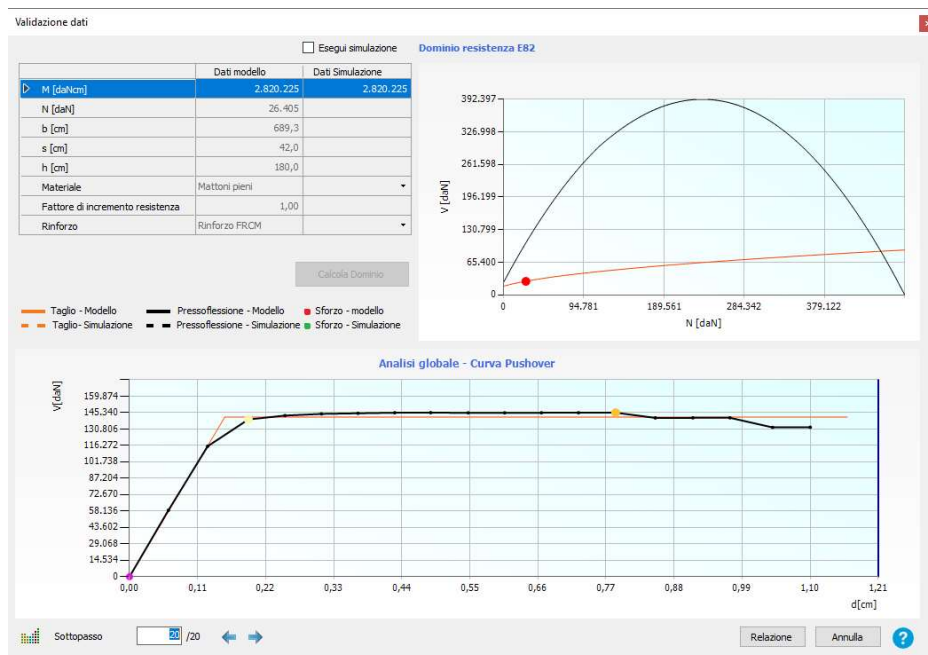
3muri Project

NEW FEATURES 13.5

Validation Tool

The interpretation of the results obtained through a pushover analysis is often complicated and this affects the choice of the interventions to be made to the structure.

By using this tool, it will be possible to display, for each wall bay and for each step of the curve, the related resistance domains.



This tool allows to carry out a simulation through which, by modifying the materials values, or the geometries or by inserting elements/reinforcing interventions, it is possible to analyse how the element's behaviour changes.

This faculty allows the designer to hypothesize "targeted" choices of intervention, evaluating beforehand the potential improvement even before re-executing any pushover calculation.

Alongside the classical calculation report, a document of the "validation of the calculation made" is very often requested, which can include various controls at the discretion of the designer: an essential control is the one regarding the performance of the wall bays in the seismic field.

This tool allows to check both the strength and ductility thresholds that generate the breakdown of an element.

To help the designers in the drafting of the validation document, it will be possible to create a calculation report containing all the intermediate steps of the calculation.

New results monitoring controls

A professional working tool, such as a calculation software, must make all the modelling and result interpretation operations easy.

Thanks to user feedback, the functions related to the "Results Controls" (already included in 3Muri Project) are in constant evolution.

In the results environment, a new window allows to check with precision and rapidity the elements under crisis (damage and breakage) and to verify overall the levels of deformation of each part of the structure. This tool shows a double utility: to check the accuracy of the model and to understand in which points of the structure is reasonable to act in order to design an improvement or an adaptation.

Controllo del danno

Stato di danneggiamento: Stato di danneggiamento Spostamento assoluto Spostamento relativo interpiano

Filtri visualizzazione:
 Elementi rotti Elementi plastici Elementi non efficaci

Elementi rotti passo corrente:
 dal primo passo rispetto al passo precedente

Parete	Inserisci in relazione	Muratura % Parete	Muratura % Edificio	Setti % Parete	Pilastri % Parete	Travi % Parete
1	<input type="checkbox"/>	14,5	3,5	0,0	0,0	0,0
2	<input type="checkbox"/>	0,0	0,0	0,0	0,0	0,0
3	<input type="checkbox"/>	0,0	0,0	0,0	0,0	0,0
4	<input type="checkbox"/>	0,0	0,0	0,0	0,0	0,0
5	<input type="checkbox"/>	0,0	0,0	0,0	0,0	0,0
6	<input type="checkbox"/>	0,0	0,0	0,0	0,0	0,0
7	<input type="checkbox"/>	0,0	0,0	0,0	0,0	0,0
8	<input type="checkbox"/>	0,0	0,0	0,0	0,0	0,0
9	<input type="checkbox"/>	0,0	0,0	0,0	0,0	0,0
10	<input type="checkbox"/>	0,0	0,0	0,0	0,0	0,0
11	<input type="checkbox"/>	0,0	0,0	0,0	0,0	0,0
12	<input type="checkbox"/>	0,0	0,0	0,0	0,0	0,0

Elementi totali per parete:
Muratura 24 Setti 0 Pilastri 0 Travi 0

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Controllo degli spostamenti (sia assoluti che relativi)

Stato di danneggiamento: Stato di danneggiamento Spostamento assoluto Spostamento relativo interpiano


Ux lim 8,00 [cm] Uy lim 8,00 [cm] Uz lim 2,50 [cm]

Nodo	Parete principale	Ux [cm]	Uy [cm]	Uz [cm]	Rot X [rad]	Rot Y [rad]	Pareti interessate
N1	1	0,00	0,00	0,00	0,0000	0,0000	1-4
N2	1	0,83	0,06	-0,11	-0,0002	0,0020	1-4
N3	1	0,96	0,15	-0,17	-0,0003	0,0007	1-4
N4	1	0,00	0,00	0,00	0,0000	0,0000	1-3
N5	1	0,85	-0,04	-0,06	0,0001	0,0005	1-3
N6	1	0,93	-0,08	-0,07	0,0001	0,0000	1-3
N7	2	0,00	0,00	0,00	0,0000	0,0000	2-5
N8	2	0,73	0,01	-0,01	0,0000	0,0007	2-5
N9	2	0,00	0,00	0,00	0,0000	0,0000	2-3
N10	2	0,73	-0,04	-0,09	0,0001	0,0011	2-3
N11	2	0,85	-0,08	-0,13	0,0001	0,0000	2-3
N12	2	0,00	0,00	0,00	0,0000	0,0000	2-4

Ux massimo 0,96 [cm] Uy massimo 0,17 [cm] Uz massimo 0,24 [cm]
Nodo 3 Nodo 59 Nodo 56

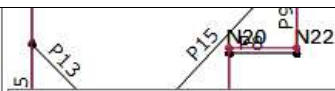
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Alerts management


The appearance of this icon  in the list of performed analyses indicates the presence of alerts related to the analysis. At the same time, in the bottom left-hand corner, a pop-up message will appear notifying the presence of alerts whose details can be viewed.

This mode allows to have an overview of all the analyses and to understand any criticalities that act transversally and not only on the single analysis.

N.	Dir. sistema	Carico statico	Eccentricità [cm]	σ SLC	σ SLV	σ SLD
13	-X	Uniforme	65,26	1,774	1,268	1,247
14	-X	Uniforme	-65,26	1,107	1,109	1,210
15	-X	Forze statiche	65,26	1,185	1,182	1,240
16	-X	Forze statiche	-65,26	1,143	1,142	1,217
17	+Y	Uniforme	111,50	1,012	0,996	1,099
18	+Y	Uniforme	-111,50	0,667	0,669	1,095
19	+Y	Forze statiche	111,50	1,027	1,001	1,068
20	+Y	Forze statiche	-111,50	0,829	0,820	1,099
21	-Y	Uniforme	111,50	0,955	0,937	1,019
22	-Y	Uniforme	-111,50	1,053	1,032	1,063
23	-Y	Forze statiche	111,50	0,789	0,766	0,741
24	-Y	Forze statiche	-111,50	0,921	0,892	0,794



Avvisi
 Sono presenti avvisi per le analisi calcolate.
 Selezionare l'apposito pulsante per maggiori dettagli.

 + Uy **Nodo di controllo 6 - Media spostamenti livello 2**

What kind of information is contained in the "Alerts"?

- Information regarding the criticality of the calculation (e.g. convergence problems) with some suggestions concerning the possible causes.
- Checks of "precision" and accuracy of the result, aimed at making appropriate corrections to the calculation in order to obtain more reliable results.
- Based on the results of the calculation, some indicators may provide "suggestions" aimed at improving the model to obtain a more reliable result.

Avvisi

Controllo numero passi curva non superato

La discretizzazione della curva deve essere tale da permettere un livello di dettaglio sufficiente a considerare il risultato di un'analisi pushover affidabile. Un numero di passi troppo limitato sulle curve pushover potrebbe incidere la bontà del risultato finale.

Continua con la consultazione

Esci

Report - Floors

The calculation report has been integrated with a descriptive part of the horizons on the basis of the data entered, in order to make the report complete and exhaustive, not only from the point of view of mechanical performance, but also of geometries and materials.

Nome	Materiali	Descrizione
Solaio tavolato piano terra	Legno travetti: ANS1Conifere. pioppo (Abete Nord 1)	Legno con travetti affiancati e tavolato semplice b [cm] = 10,0; h [cm] = 20,0; i [cm] = 50,0; T [cm] = 4,0
Putrelle Voltini Ingresso	Acciaio: S 235 (t <= 40mm) CLS: C8/10 Voltini: Mattoni pieni	Putrelle e voltini Profilo: IPE 160 i [cm] = 80,0; f [cm] = 4,0; S _y [cm] = 5,0; A piatti/m [cm ²] = 0,20; S [cm] = 4,0
Solaio primo piano	CLS: C8/10	Laterocemento b [cm] = 10,0; i [cm] = 50,0; h solaio [cm] = 24; S [cm] = 8,0
Solaio tavolato piano terra Soletta	Legno travetti: ANS1Conifere. pioppo (Abete Nord 1) CLS: C8/10	Legno con soletta b [cm] = 10,0; h [cm] = 20,0; S [cm] = 8,0
Solaio lamiera	Acciaio: S220GD	Lamiera grecata Profilo: Esempio2

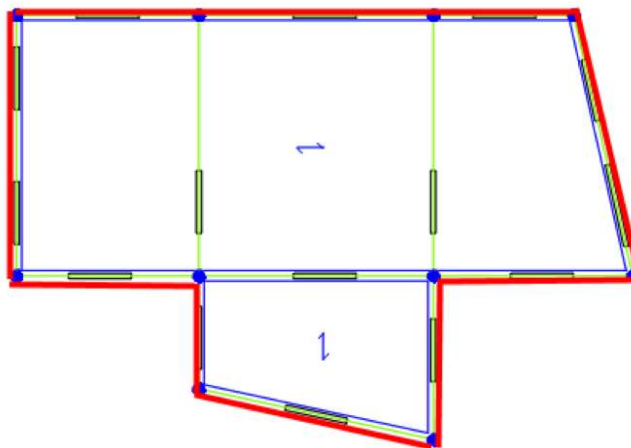
Solaio

N.	Archivio	Quota [cm]	Spessore [cm]	G [N/mm ²]	Ex [N/mm ²]	Ey [N/mm ²]	Scarico masse	Tipo
1	Solaio tavolato piano terra	300	4,0	10,00	12.000,00	0,00	Monodirezionale	Legno con travetti affiancati e tavolato semplice
2	Putrelle Voltini Ingresso	300	8,0	10.954,58	13.184,06	131,25	Monodirezionale	Putrelle e voltini
3	Solaio primo piano	300	8,0	10.554,58	35.463,40	25.331,00	Monodirezionale	Laterocemento

Automatic detection of external walls

Currently the distinction between external and internal walls, for the application of a FRP/FRCM composite reinforcement or the insertion of the wind load, must be done manually on each element.

On the contrary, in the future the recognition of external facades will be totally automatic, leaving to the user maximum freedom to modify manually the element's property in order to automatically update all the attributes dependent on it.

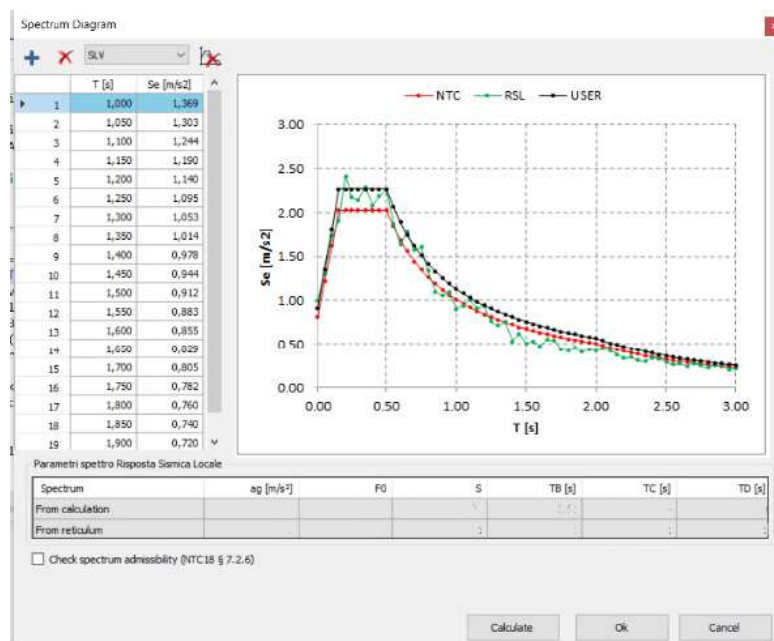


Local seismic response

According to *Appendix 1- Annex 1 of Ordinance No. 55 of April 24th, 2018*, it is indicated a procedure for regularization of a response spectrum produced by a numerical simulation, transforming it into a standard spectrum.

This functionality will be implemented in the software, allowing the transition from a spectrum by points to one in which a_g , S , F_0 , T_B , T_C , T_D are known.

This will allow to obtain a correct identification of the vulnerability parameters, both in terms of acceleration and return period, otherwise impossible by a single point input.



Level management

A calculation software must surely be easy to use in the input phase, but it must also be easy to use in the modification phase.

The classic modelling approach is to begin by modelling the structure from the foundation upwards.

Occasionally, working in historical contexts of building aggregates, it is not trivial to immediately understand the overall conformation and, perhaps, it is necessary to operate at a later time acting on the lower levels.

At present, the modification of lower levels is allowed, but not their elimination.

Therefore, in order to make easier the realization of the model within the modelling environment, the possibility of eliminating the lower levels of the structure will be added.

ADDITIONAL MODULES

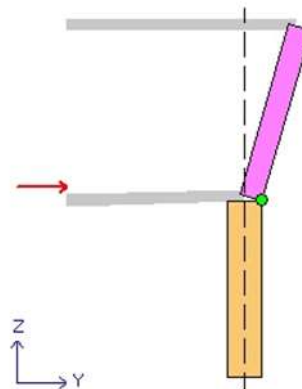
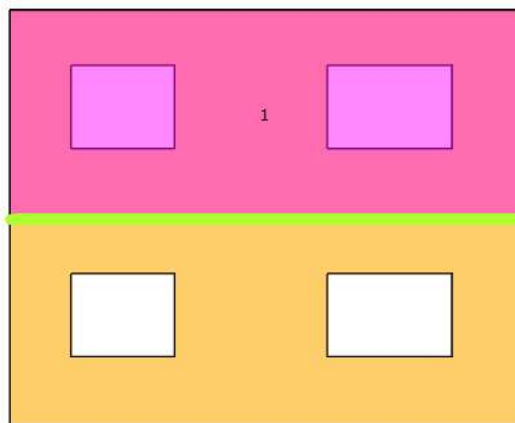
New Features

LOCAL MECHANISMS - Report

In the Module "Local Mechanisms", in order to make the calculation report richer and richer in illustrative contents, in addition to what already exists, for the analysis of kinematics it will be added: the table of calculation results and the illustrative images.

The latter will provide an important graphic support that will allow to better identify the kinematic motion under examination.

Moltiplicatore attivazione (a0)	0,057
az_SLV [m/s ²]	1,1006
az(0) (SLV) [m/s ²]	2,9511
Coefficiente sicurezza $\frac{PGAc}{PGAd}$ (SLV)	0,37
Verifica superata	No



Moltiplicatore attivazione (a0)	0,057
az_SLV [m/s ²]	1,1006
az(0) (SLV) [m/s ²]	2,9511
Coefficiente sicurezza $\frac{PGAc}{PGAd}$ (SLV)	0,37
Verifica superata	No

