FAQ - Finding the optimal sandwich panel with SandStat - module SandTweak!

The optional available Modul SandTweak has the possibility to determine optimal panel from a selection of sandwich panels.

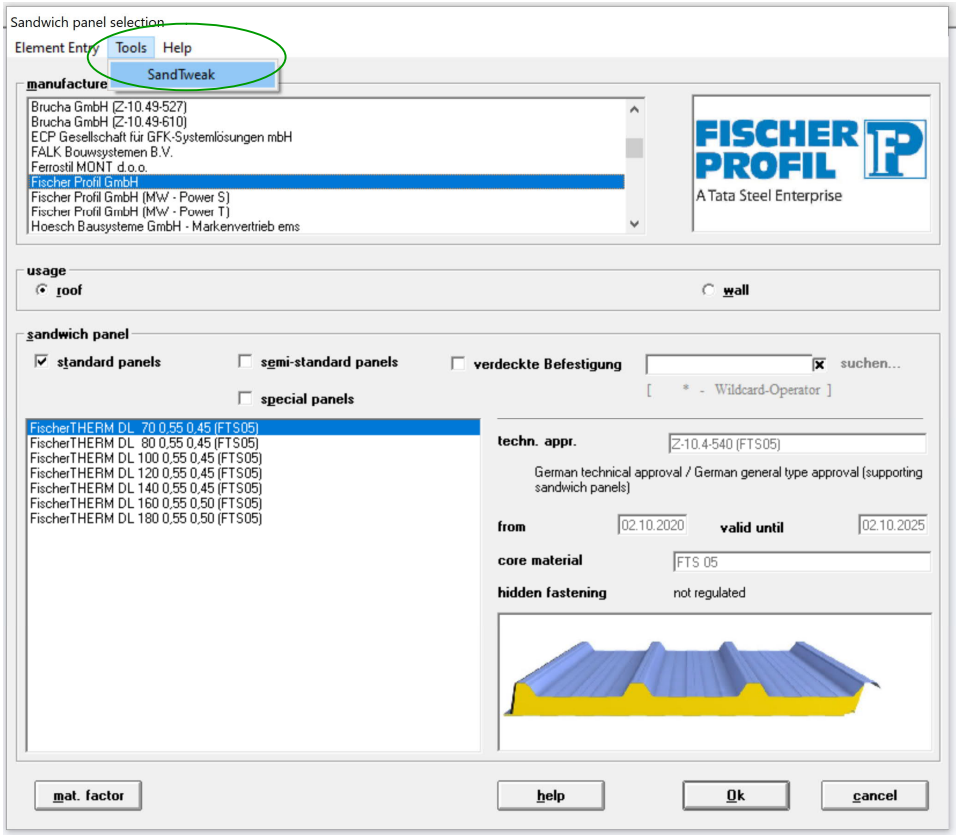
It offers the possibility to create user-defined panel portfolios or groups and to calculate them efficiently in one process.

The tabular comparison of the individual panel verifications and the respective design overview of each sandwich panel, right up to hidden fixing, enables you to determine the optimum sandwich panel for your existing static system and load with just a few mouse clicks.

A clear printout enables you to quickly show feasible alternatives in a customer meeting or within the scope of preliminary dimensioning.

Explanation of SandTweak

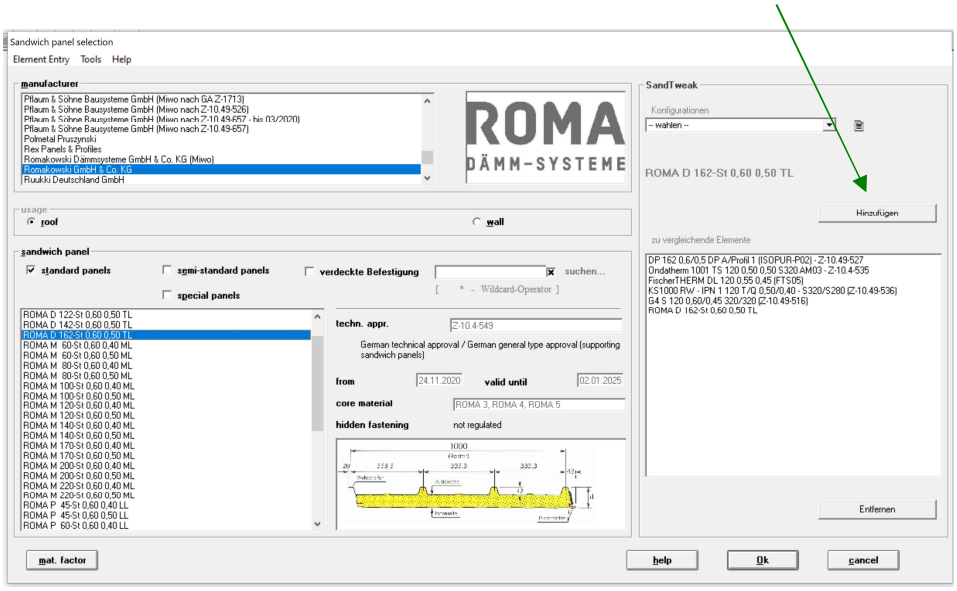
At "sandwich panel selection" dialog, the optional menu item "Tools" - "SandTweak" is visible if the module is included in the respective license:



Please note that after selecting the "SandTweak" option, the place of use (roof or wall element) is preset. If you want to change from roof to wall (or vice versa), "SandTweak" must be cancelled first. Mixed viewing of wall and roof elements is not possible due to the system.

1) Selecting the sandwich panels to be calculated

In the mask for selecting sandwich panels, after defining "roof element" or "wall element", the panels to be calculated can be selected on the left side and added to the list of panels to be compared in the right area of the mask using the "Hinzufügen" button.



The sandwich panels of different manufacturers and approvals can be selected, but also several sandwich panels of one manufacturer. The selection can be made by double-clicking on the respective element or by clicking on the "Hinzufügen" button.

At the bottom right of the screen, you can delete selected elements from the list by clicking "Entfernen".

Please note that the calculation time depends on the number of elements.

Note: Sandwich panels listed here are exemplary and arbitrarily chosen. Of course, almost all other element types are also selectable.

For saving possible element groupings, see section 6 in this FAQ.

2) Definition of the tolerances, the static system and the load

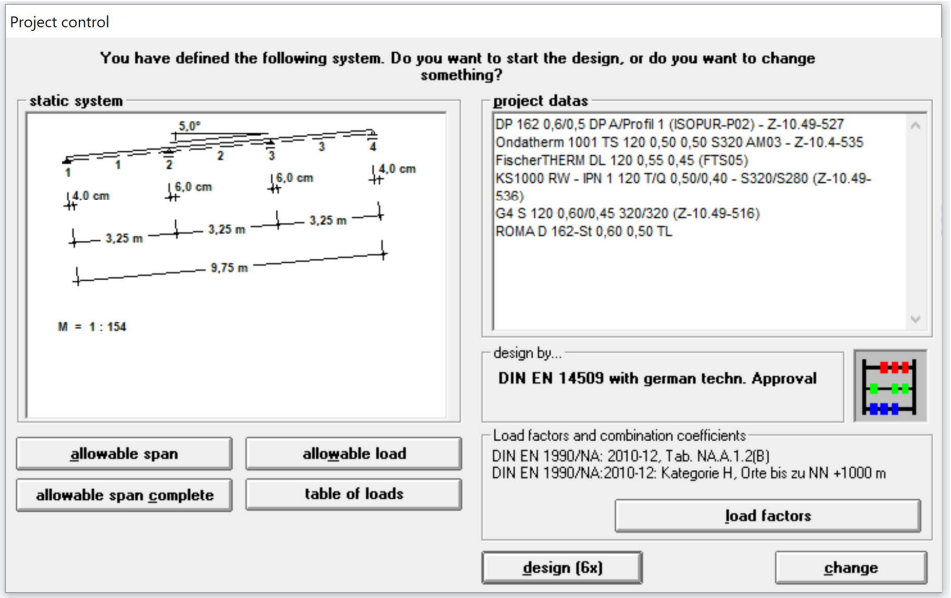
The selected tolerance conditions for getting the design thicknesses of face layers t_{di} are only set for the first selected sandwich panel. The basic settings are then applied to all other types.

Subsequently, the static system is defined under "System input" and the load is defined under "Load generation" or "Manual load input" as usual.

For roof panels, SandStat internally uses the correct self-weight for the concerned panel at the calculation.

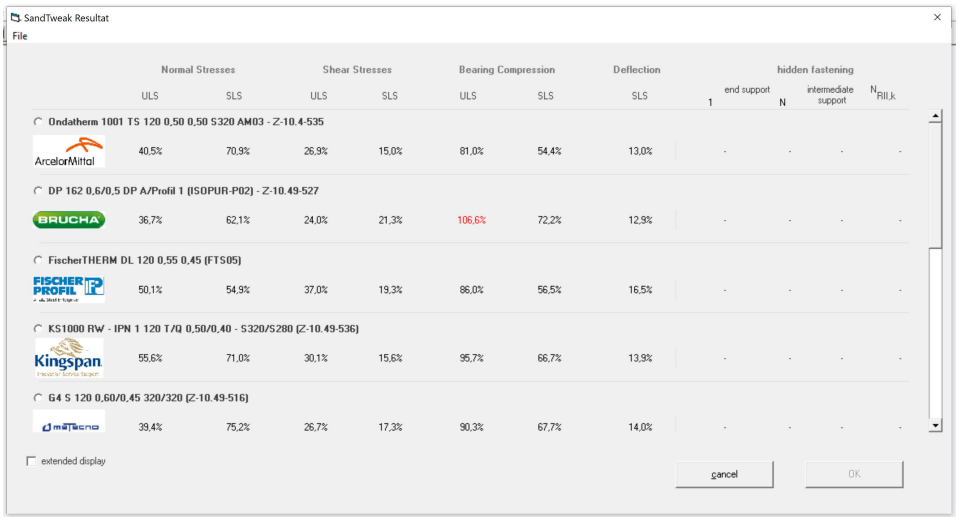
3) Starting the calculation

The calculation is then started in the "project control" screen - if necessary after adjusting the load factors and combination coefficients:



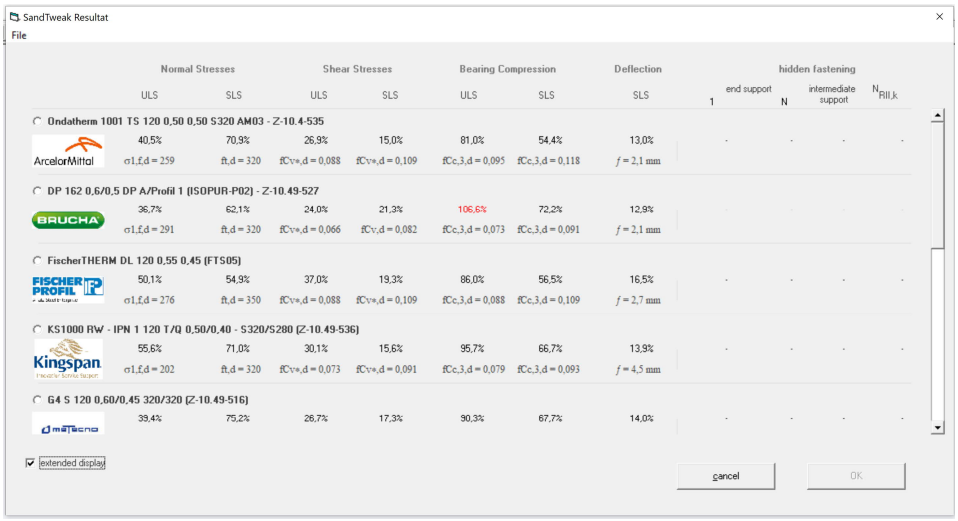
4) Results

The results of the individual calculations are displayed in the mask shown below:



The results are presented in tabular form as utilization in % separately for the individual verifications - both at serviceability limit state and at ultimate limit state. If no elements with hidden fixing have been selected, the corresponding table columns remain empty.

By selecting the "extended display", the associated ultimate limit values can additionally be displayed in N/mm² or MPa:



Indexes:1, 2 upper, inner face layer (normal stresses)
f, s in span, at support
T elevated temperature
d design value
n decisive support (compression stresses)
f decisive deflection

Important notes on the results:

a) The results can be printed on any printer by selecting "File"/"Print". The information of this printout additionally receives the specifications of the static system as well as the load in addition to the results.

b) For plane or lightly profiled faces, the basic value of the wrinkling stresses is applied. A reduction of the wrinkling stress depending on the selected number of fasteners is **not** performed at this point. For complete verification, the number of fasteners must be selected in a further step and - if necessary - the wrinkling stress reduced as a function of their number (which is then supported automatically by SandStat).

c) For a closer look at a sandwich panel, it can be selected. By clicking the "OK" button, this panel is calculated again and the verification overview is displayed. The connections to the substructure can then be designed.

5) Hidden fixing

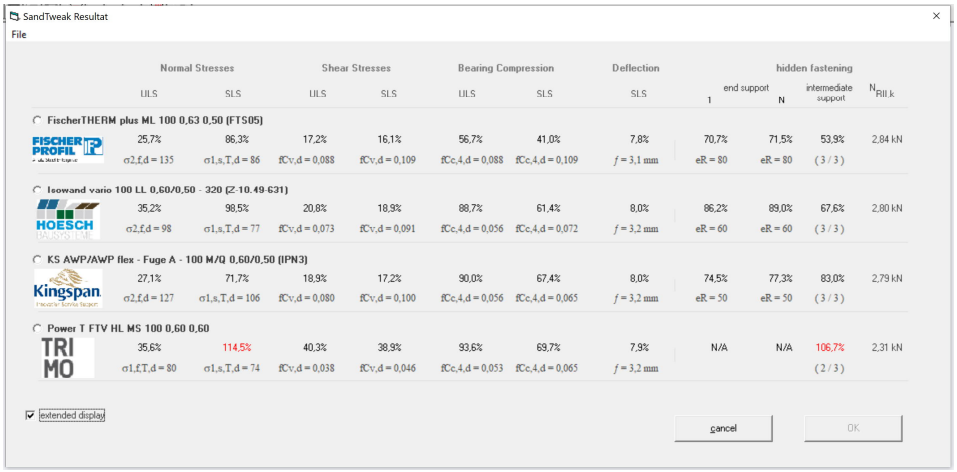
If sandwich panels with hidden fixing are selected, the four right columns of the results table are filled with values:

The utilization factor at first support (1), at last support (N) and the most unfavorable intermediate support is considered. The "best" variant of the hidden fixing is used in this analysis, provided that the calculation basis allows this.

The column "$N_{RII,k}$" shows the associated required characteristic tensile capacity value of the fastener (tearing out of the substructure as well as failure of the fastener) in kN.

The "extended display" shows additional information such as the required edge distance (eR) and - in brackets - the number of intermediate supports where the hidden fixing is possible.

Example: „(2/2)“ both intermediate supports can be executed with hidden fixing.
„(2/3)“ only two of the three intermediate supports can be executed with hidden fixing.



Important remarks concerning hidden fixings:

a) In case of different designs of the hidden fixing (e.g. with or without load distribution plate, different load distribution plates or number of fasteners, etc.), the design with the highest resistance value $N_{RV,k}$ is used - separately for the intermediate support(s) or for the respective end support(s) (with the corresponding boundary conditions).

b) The option "verdecktPlus" (additional visible fixings - see FAQ "The new fastener mask in SandStat") is not considered at this point.

c) Only the failure of the hidden fixing is considered. In a subsequent step, the fastener itself or the pull-out of the substructure must also be considered. For this purpose, the value "$N_{RII,k}$" [kN] is specified, which must be reached by the fixing. This value is the unfavorable value of the end or intermediate support and refers to a single fastener.

d) Furthermore SandStat does not take into account a possibly existing thin-walled assymetrical substructure with the required reduction of the resistance values to 70%.

e) Possible additional verifications of the shear force bearing capacity and interaction verifications of the fasteners are not considered at this point for the time being.

6) Panel group configuration

During panel selection, the selected panels can be saved in a configuration file. For subsequent calculations and considerations this configuration can be read in again, in order not to have to search and group all elements again.

For this please select in the sandwich panel selection - after adding the panels - the icon  in the upper area and enter the designation in the following mask.

A configuration that is not required can be deleted by selecting the red cross  .