



Welcome to the TRNFLOW Demo Version!

TRNSYS thermal multizone building model, type 56, requires air flows between zones as input values. However, in natural ventilation systems these depend on the wind pressures and the inside and outside temperatures. To account for this situation, a coupling with an air flow model is absolutely necessary. TRNFLOW integrates the multi-zone air flow model COMIS into the type 56. An internal solver, optimized for this task, iterates in each time step between the two models until their solutions are consistent. The existing user surface TRNBuild was extended in such a way that data for the air flow model can be entered. Thus a user-friendly handling of the coupling is assured. With TRNFLOW, a immense step forward has been made for building simulation with TRNSYS.

This demo allows you to explore all TRNFLOW components via the TRNBuild user interface of TRNSYS. Simply start the TRNBUILD_TF_DEMO program from the Windows menu START\PROGRAMS\TRNFLOW_DEMO.

An example project is included in the folder TRNFLOW_DEMO\TRNFLOW_Example\REST_COM.BUI. Choose File/Open to have a look at the example.

Building model of the example

The TRNFlow example is based on the “simple TRNBuild example” described in the TRNSYS manual Vol. 6 chapter 6.3.7.

As an example, the heating requirements of a restaurant will be considered. The restaurant consists of three zones: the dining room, the kitchen, and a storage area. A floor plan of the building is shown in figure 1. The dining room faces directly south and has a large double-glazed window. General data concerning the restaurant is as follows.

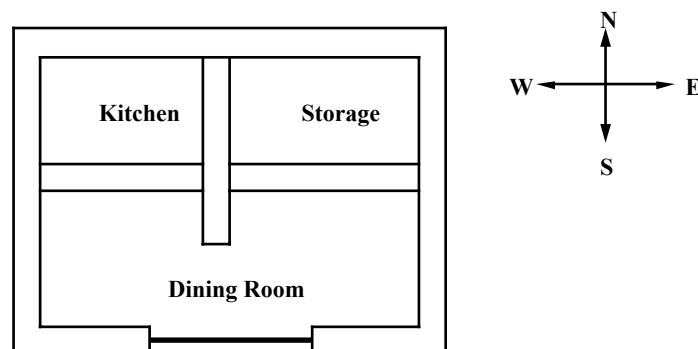


Figure 1: Floor Plan of Restaurant Example

1) Structure There are two types of walls: exterior and interior. The floor consists of a concrete slab on the ground, an insulation layer and stone tiling. The only window, located in the dining room, has two glazings. The flat roof has the following structure (from inside to outside): plaster board, air gap, insulation, concrete, roofing. The heat transfer coefficient at the outside of the exterior walls and roof varies with the wind speed.

2) Air Flows The infiltration rate is fixed at a half an air change per hour during unoccupied times. For the dining room, there is an additional infiltration that follows the influx of customers. Part of this extra infiltration is considered to flow from the dining area to the kitchen. The maximum convective coupling from the dining room to the kitchen is 25 kilograms per hour. The kitchen is also ventilated during working hours at a rate of a half of an air change per hour.

3) Gains There are gains from people and lights in both the dining room and kitchen. The kitchen also has gains associated with the stoves. The lights are on whenever the building is occupied. The schedule of customers differs for weekdays and weekends. The storage room has fixed gains from a freezer.

4) Heating The kitchen and dining room are maintained at 20 degrees Celsius during occupied hours and at 15 degrees other times. The storage area is unheated.

5) Cooling A small room air conditioner is located in the kitchen which turns on if the temperature rises above 25 degrees Celsius.

TRNFlow model of the example

Instead of user defined schedules or inputs for air flows like ventilation, infiltration and coupling, the air flows are calculated depending on the climatic conditions by TRNFlow . In figure 2 the airflow model of the included example of the restaurant is shown. The parameters of the example may be modified but not saved

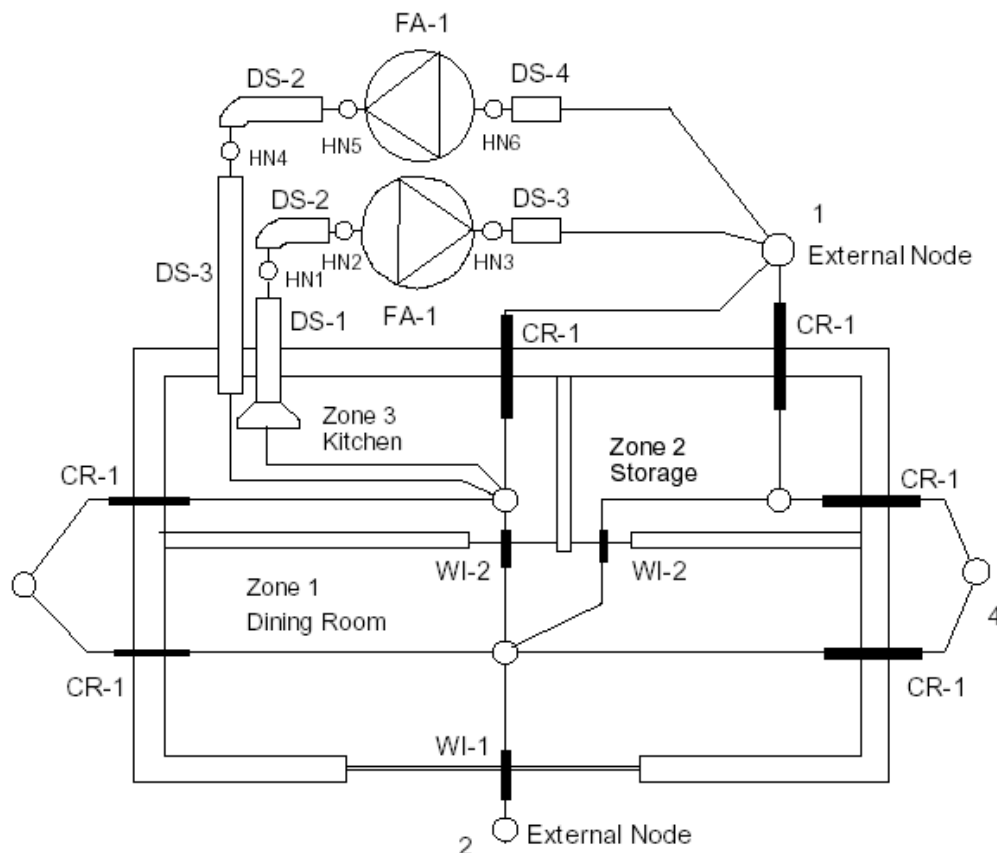


Figure 2 - Floor Plan of the Restaurant Example including airflow model

The definition of the airflow network is shown in figure 3. The definition window is opened by clicking on TRNFlow within the TRNBuild Manager.

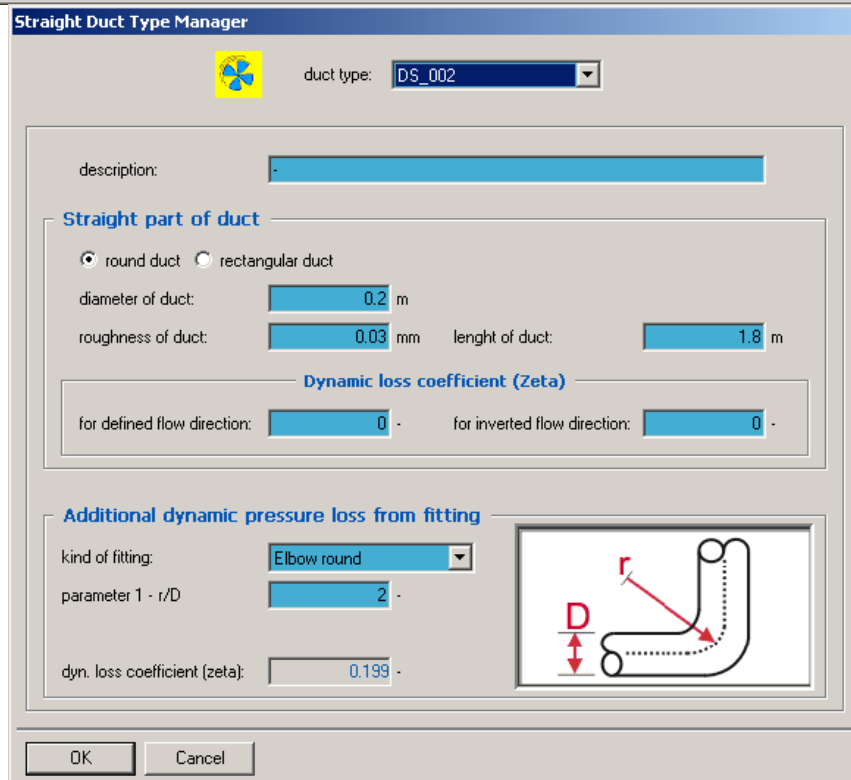
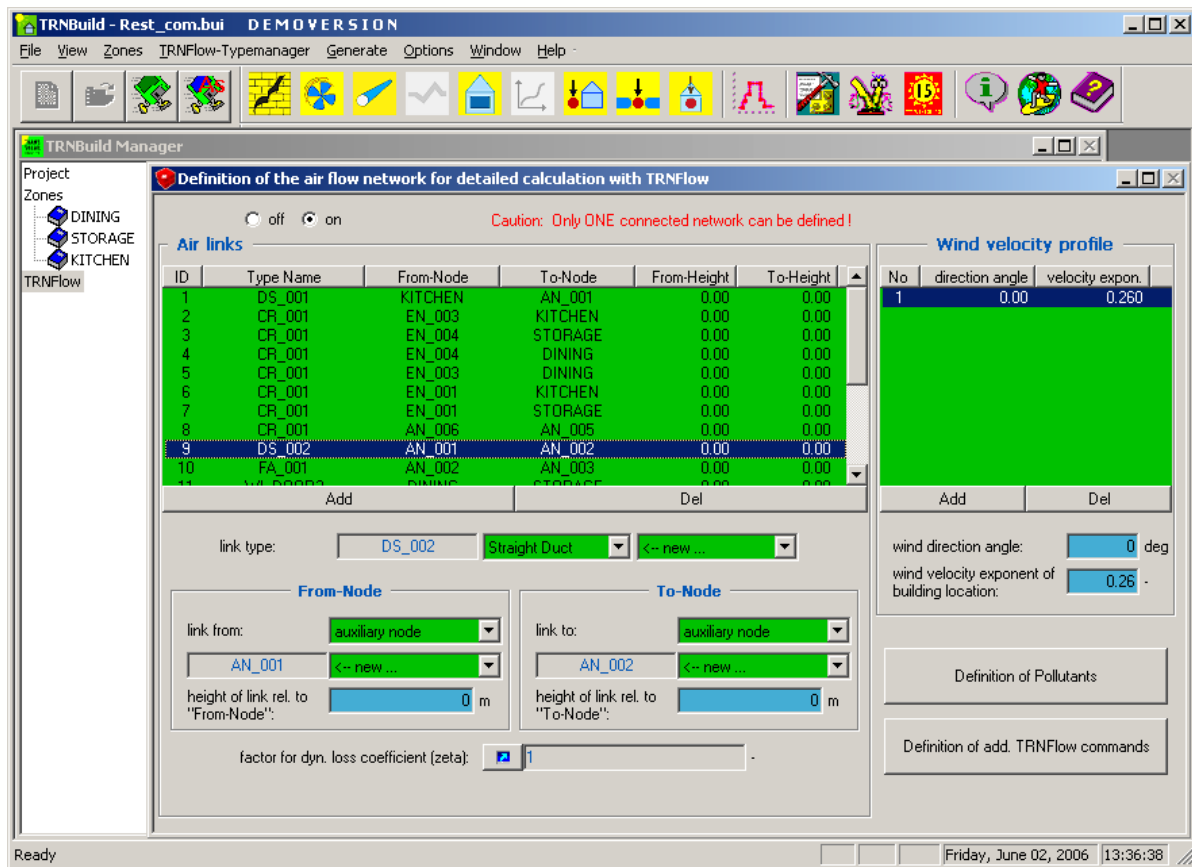


Figure 3 – TRNFlow air model in TRNBuild (e.g. component duct)

TRNSYS Studio project of the example

In addition, the example project file of the TRNSYS Studio is included (see figure 4). The file TRNFLOW_DEMO\TRNFLOW_Example\REST_COM.tpf can be opened by your TRNSYS Studio. (Note: the TRNSYS Studio is not included in the TRNFlow Demo)

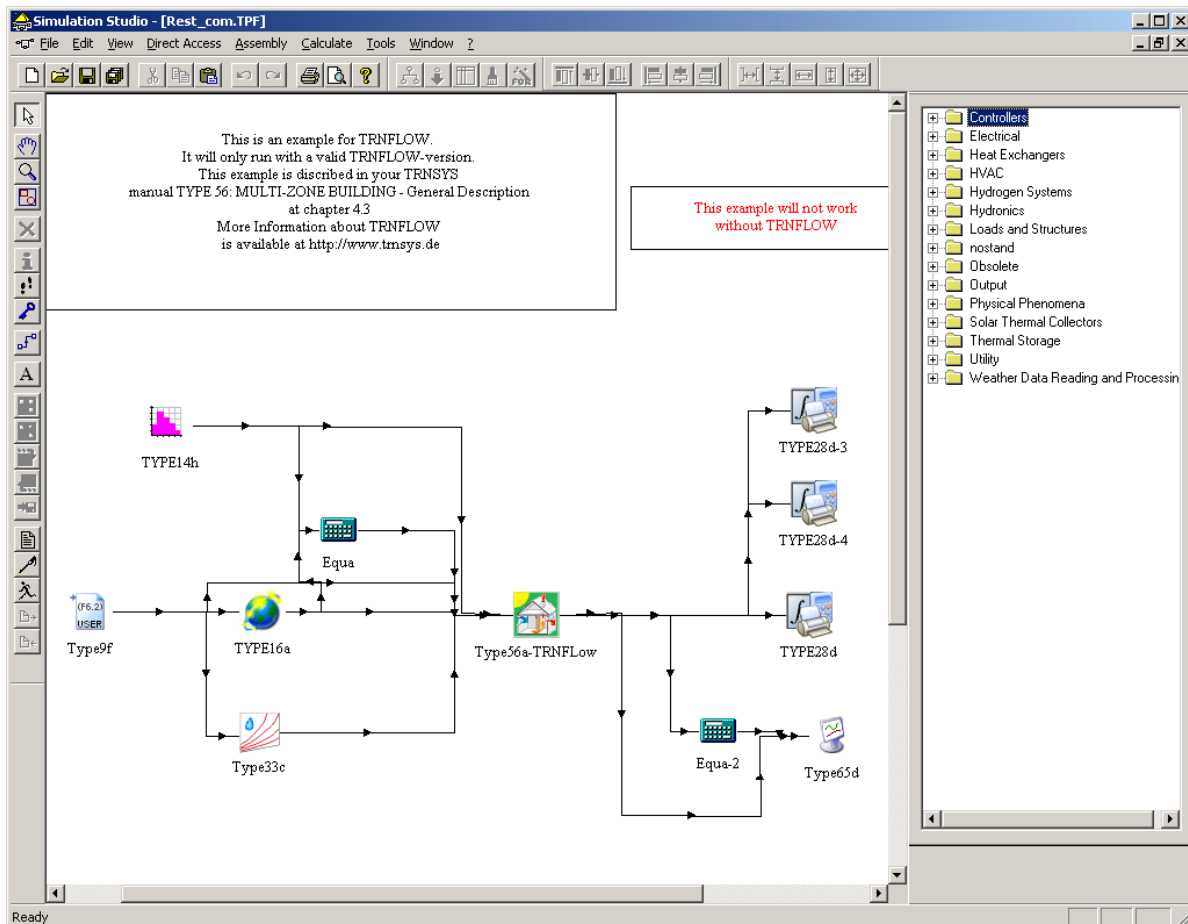


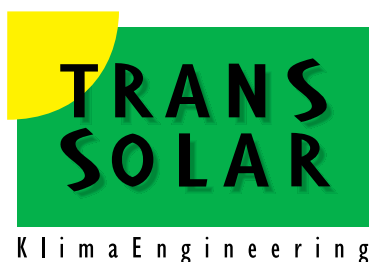
Figure 4 – TRNSYS Studio project of the Restaurant Example including TRNFLOW

Documentation

The manuals of TRNFlow and TRNBuild are located in the folder TRNFLOW_DEMO\documentation.

Further Questions

If you have further questions, please do not hesitate to contact your TRNSYS distributor:



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