What is the THERM approach?

Getting Started

THERM has utilised expertise from Toyota Kaizen, Airbus StReTCh and Cranfield University (research into industry responses to improving manufacturing processes) to create the integrated THERM tool.

The tool integrates manufacturing process into building modelling at a fundamental level; it also encodes the expertise of Kaizen and StReTCh into a detailed structured method that guides users through an improvement workflow for both building and manufacturing simultaneously.

The THERM approach is characterised by seven key steps or *Attitudes*:

1. Enable
2. Stop
3. Eliminate
4. Repair
5. Reduce
6. Recover
7. Change

Attitudes is used deliberately as success in finding / implementing opportunities for improvement is dependent upon engendering a culture in the workforce; this aspect cannot be emphasised enough.

The THERM workflow encodes these attitudes and includes automation and tools to deliver opportunities for improvement in an effective manner. Key to organising the complexity of integrating manufacturing into a building modelling environment is the use of VE-Components; these encapsulate manufacturing data into virtual objects that can interact with the thermal model but at the same time provide a parallel data hierarchy both in data terms and visually so that users can organise, navigate and review data and output in a manageable way.

Indeed this approach has been designed to facilitate numerous specialists working on the same project plus the long term use of and reuse of project sub-elements to maximise the investment a manufacturer has made in time and data in such a complex virtual model.

The workflow is structured to deliver opportunities at all levels of resolution so that users can derive increasing benefits as users add greater detail and data. As the manufacturer becomes "more advanced" in sustainable manufacturing, increased quality and more detailed data is required to further identify opportunities.

The tool utilises the VE Navigator technology to deliver the THERM workflow; THERM is comprised of eight Navigators that organise the approach into a sequence that can be used in part or whole and iterated:

- **Settings**;
- **Factory gate analysis**; this Navigator utilises meter data to find opportunities for improvement without the need for a building model;
- **Building geometry**;
- **Process mapping**; this Navigator assists users in increasing their metering resolution, monitoring and capturing real data plus creating a simple integrated model that provides a framework for finding more detailed opportunities for improvement;
- **Design & measured analysis**; this Navigator utilises monitored data and basic design data for finding more detailed opportunities for improvement in monitored data;

- **Building mapping**; this Navigator assists users in creating a complex integrated model that provides a framework for finding more detailed opportunities for improvement in simulated & monitored data. This stage involves the creation of detailed HVAC & control systems;
- **Simulated analysis**; this Navigator utilises monitored, design and simulated data and detailed design information for finding more detailed opportunities for improvement in monitored, design and simulated data;
- **Tools**