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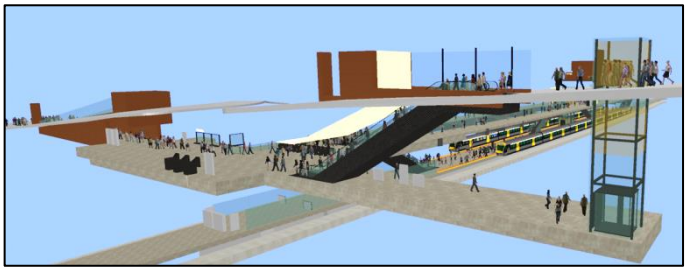
STEPS
SIMULATING PEDESTRIAN DYNAMICS

Key features of STEPS software



3D Approach

STEPS provides a fully 3D modelling environment, enabling efficient and intuitive model building and simulation of complex multilevel facilities, such as transport interchanges and multi-storey buildings. This is especially important for modelling vertical transportation, including lifts, which can be both difficult and limited in other products.

Import Options

STEPS offers direct 2D and 3D CAD import options in standard file formats (e.g. DXF and FBX)

STEPS supports the import of BIM files in IFC format, enabling users to import a major project layout in minutes. With automatic creation of detailed 3D geometry offering enhanced rendering, and functional import, with automatic creation of circulation area, exits, blockages and basic stairs, it allows for rapid modelling and early results feedback.

Advanced Lift Modelling Capabilities

STEPS offers advanced lift modelling based on CIBSE Guide D. The movement of lifts is determined by external and/or internal calls by lift users. As a result, the dwell time per floor, and therefore, the lift cycle time, is adjusted based on the level of demand.

STEPS also includes the options to model people waiting in lift lobbies and operate lift doors asynchronously (i.e. delay between opening time of front and back doors). A phased evacuation can also be modelled with lifts, with priority given either to top floors or ‘fire’ floors.

Stair, Escalators and Ramps

Due to the 3D modelling environment, stairs, escalators and ramps can be easily created to efficiently connect multiple levels. Walking speeds are automatically adjusted based on the stair/escalator/ramp angle. The user can also define specific walking speeds to model, for example, people standing on one escalator lane while others walk on the other.
Other parameters such as speed and capacity are also user-defined.

Normal and Evacuation Operations

STEPS offers a full capability in both normal operations and evacuation. It also provides the ability to switch from one phased evacuations.

Flow rates are based on the NFPA 130 standard by default but can be customised by the user to match capacities defined in a different standard.

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Interaction with Vehicles

STEPS can model interactions between people and 3D moving vehicles (e.g. trains, buses and trams), enabling users to model vehicle arrivals/departures, as well as people boarding and alighting.

Representation of People

Individual people with unique attributes, such as walking speed, patience, and environment familiarity, can be created. STEPS allows the user to define culturally-specific walking speed distributions, which can be combined with speed-distance or speed-density relationships chosen by the user.

A large library of 3D people models, including passengers with reduced mobility, is available. STEPS also provides user definable parameters, such as pre-movement delay, walking speed/density relationship and route choice.

Smoke Data Import

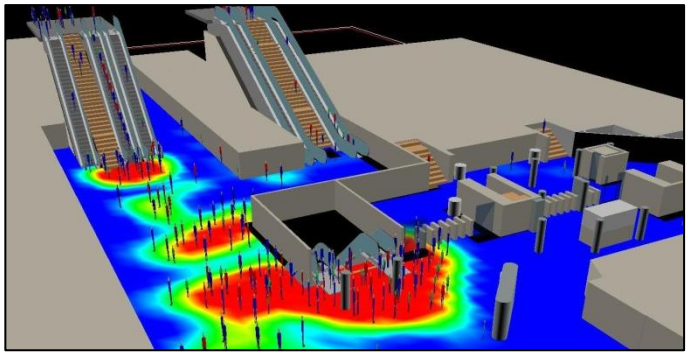
STEPS can import smoke data from various CFD packages, such as FDS, CFX and Fluent, as well as the NIST CFAST zone model. This data can be represented visually using smoke isosurfaces and can affect the walking speed via the Jin-Yamada or other relationships.

STEPS can also calculate the total accumulated exposure dose data for any toxic element by importing smoke data from CFX or FDS.

User-friendly Interface

STEPS is a practical engineering tool, able to handle very large populations and complex geometric arrangements. It operates in one single interface, for model-building, simulation and analysis, creating a simple and efficient process. STEPS allows the use of multiple cores available on modern processors, reducing simulation times substantially.

The algorithms employed are always made clear to the users and there are many options to tailor them to a specific application or make expert judgements. Some other tools are more like "black boxes" – with no option for the user to customize it in any way.



Modelling Outputs

STEPS can produce high quality visual outputs, such as 2D and 3D still images and animations in multiple file formats. Density maps in relation to Fruin Level of Service (LOS), as well as numerical data outputs, such as flow rates, waiting time, queue length, journey time, usage and egress time, can be extracted from STEPS.

Through STEPS LIVE, the user to present, share and distribute your results created within STEPS in a 3D fully interactive, standalone package that is easy to use and distribute.