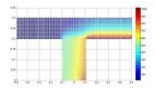

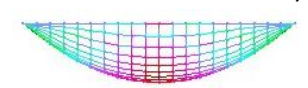
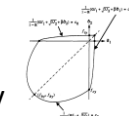

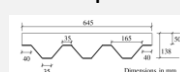


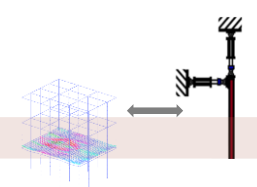



OPENSEES FOR FIRE ROADMAP

	By 2020	2020-2021	After 2021
Fire Model & Heat Transfer	<ul style="list-style-type: none"> OpenFIRE (OpenSees-FDS Middleware) Heat Transfer (HT) module <ul style="list-style-type: none"> -Tcl/Python Script -Idealised uniform fire models (standard, parametric) -Idealised non-uniform fire models (localised, travelling fires) 	<ul style="list-style-type: none"> OpenFIRE (OpenSees-FireFoam Middleware) Travelling fire models <ul style="list-style-type: none"> -considering travelling mechanism HT sections for composite column HT material for timber sections 	<ul style="list-style-type: none"> AI enhanced fire model <ul style="list-style-type: none"> -predicting fire behaviour
Thermo-mechanical Analysis	<ul style="list-style-type: none"> Frame members in fire <ul style="list-style-type: none"> -TM BeamColumn elements (Disp&Force based) -Fibre based TM sections -Uniaxial materials (concrete& steel) Slabs in fire <ul style="list-style-type: none"> -TM Shell elements (ShellMITC4Thermal & ShellNLDKGQThermal) -Layered shell section -TM multiaxial material <ul style="list-style-type: none"> PlateRebarThermal ConcreteDamagePlasticity   	<ul style="list-style-type: none"> 3D thermo-mechanical solid elements <ul style="list-style-type: none"> -Continuum elements Integrated model for composite floor in fire <ul style="list-style-type: none"> -Rib section -Efficient model  	<ul style="list-style-type: none"> Large 'structure in fire' model Two-way interaction (Fire-Structure) <ul style="list-style-type: none"> --Non-structural components in fire -- Structural deflection 
Struc in Fire Application	<ul style="list-style-type: none"> SIFBuilder (Integrated Structure in fire simulation tool) GiD-OpenSees interface for SiF analyses 	<ul style="list-style-type: none"> Tall Building Collapse in fire case studies (Plasco, WTC7) Python based GUI pre-processor 	<ul style="list-style-type: none"> Post-processors for 'structure in fire' simulation
Algorithm & Solution	<ul style="list-style-type: none"> Static analysis <ul style="list-style-type: none"> - Time step, fire duration 	<ul style="list-style-type: none"> Auto removal solution for failed elements Arc-length solution 	<ul style="list-style-type: none"> Static-dynamic solution