

Travelling Fires for the Structural Design of Modern Buildings

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TRAVELLING FIRES?

- Current Design Codes



Limitations:

Floor areas < 500 m²

Heights < 4 m

! Only 8% of volume
within limitations



- Large open-plan compartments - ?

AIM of this research

Develop **tools** to
design structures to
resist travelling fires

TRAVELLING FIRES METHODOLOGY

- Developed by Stern-Gottfried, Law and Rein

Near-Field

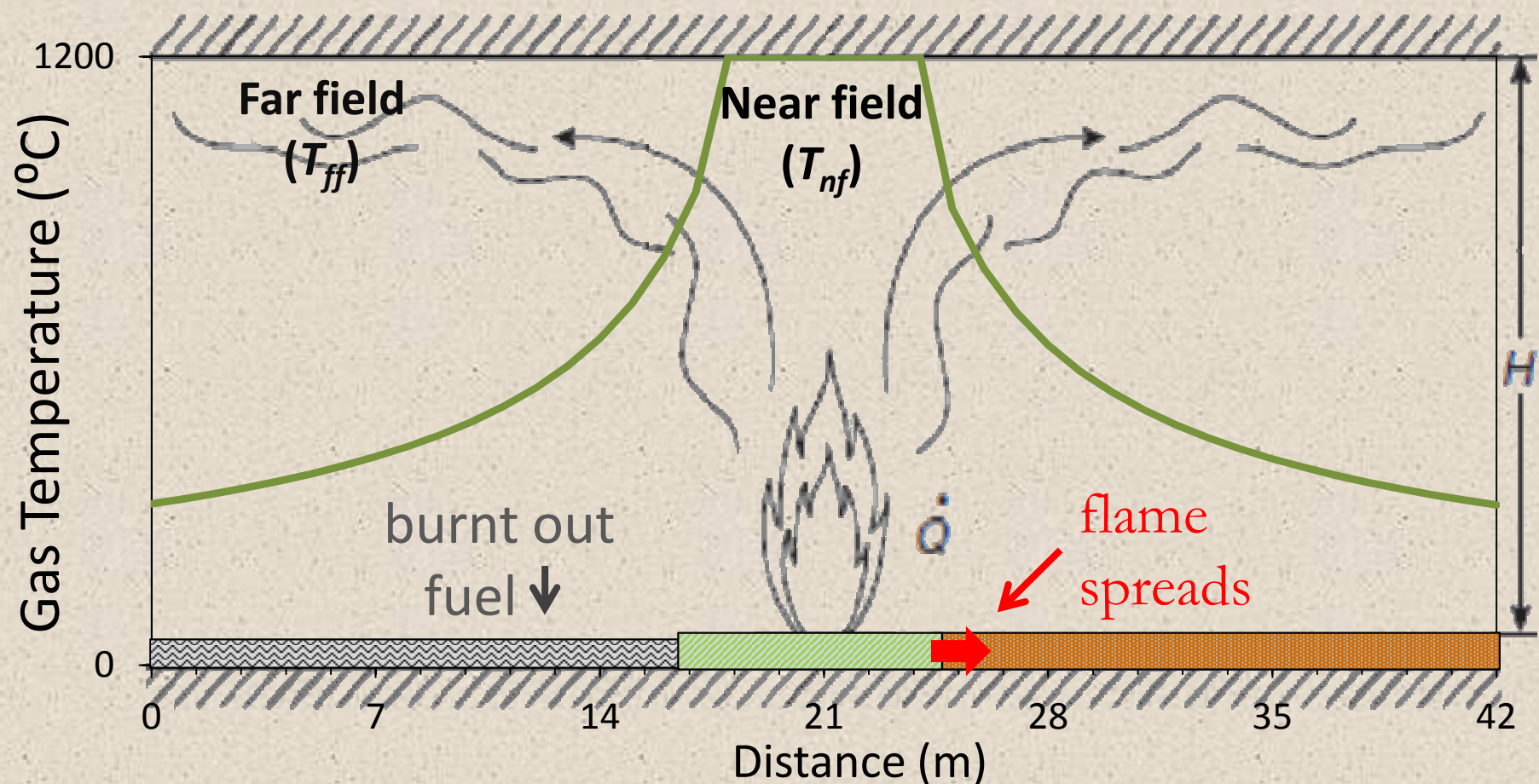
Flames → short and hot

$$T_{nf} = 1200^{\circ}\text{C}$$

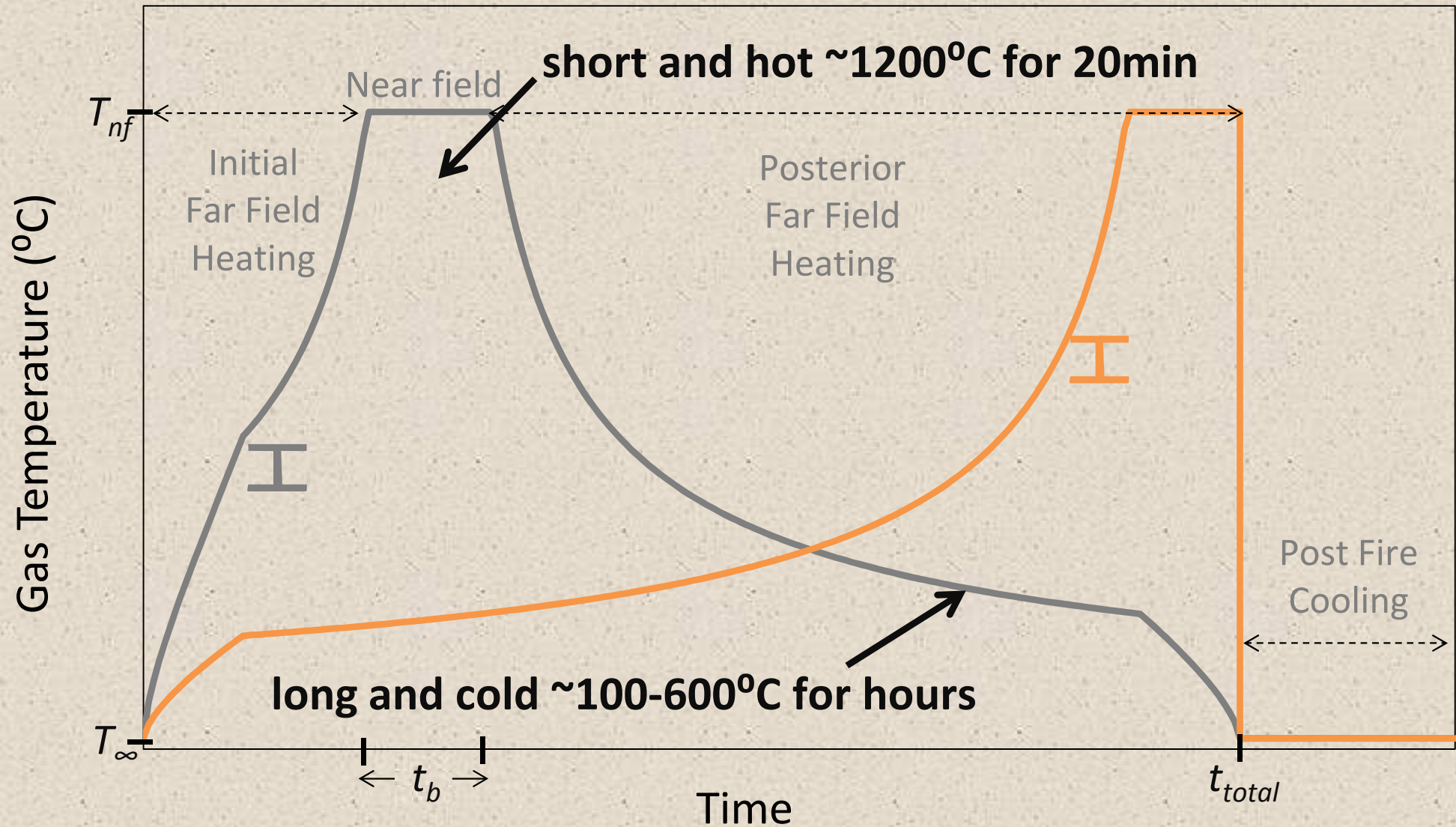
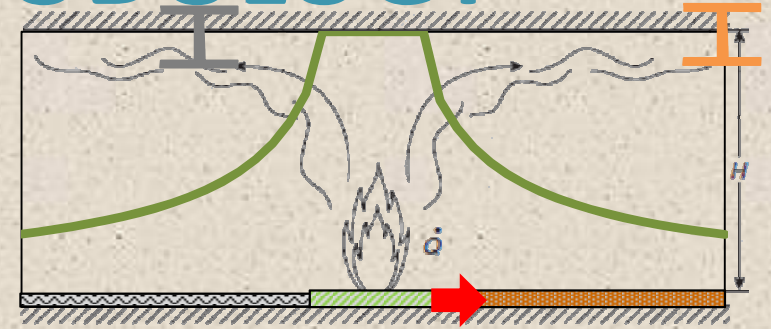
Far-Field

Smoke → long and cool

$$T_{ff}(x, t) = T_{\infty} + \frac{5.38}{H} \left(\frac{L L_t^* W \dot{Q}''}{x + 0.5 L L_t^* - \dot{x}_t} \right)^{2/3}$$



TRAVELLING FIRES METHODOLOGY



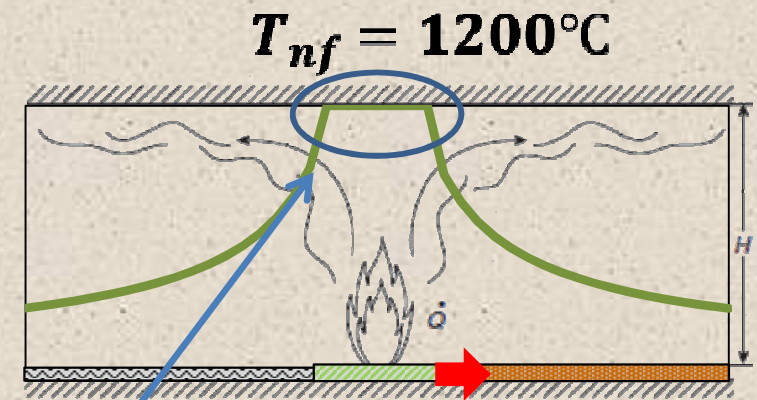
RESEARCH OBJECTIVES

WORK DONE

- Continuous analytical correlation
- Flame flapping region

FUTURE

- More realistic near field temperature
- To investigate different fire paths in complex geometries
- Application of TFM to timber, concrete and steel members
- Analysis of simple frames



Thank You!