Computer Models
For
Fire and Smoke

Model Name:	RadPro
Version:	02
Classification:	Fire Radiation Intensity Model
Very Short Description:	RadPro calculates the safe distance between buildings or other objects to prevent fire spread by thermal radiation.
Modeler(s), Organization(s):	SimCo Consulting
User's Guide:	Integrated in Help File
Technical References:	Help File
Validation References:	The RadPro calculates the safe distance with the aid of approximate formulae of Williams-Leir [Ref. T.T.Lie].
Availability:	SimCo@alphalink.com.au
Price:	$ 50
Necessary Hardware:	Intel architecture running Windows 95 or higher
Computer Language:	Delphi (pascal)
Size:	-----
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Detailed Description:

The RadPro program evaluates the impact of the relative shapes and distances on the heat transfer between the 'radiator' and the 'receiver' surfaces. The approach applied may be summarized as follows:

For known values of the critical incident radiant intensity (at the receiver, i.e. the exposed surface) and the emitted radiant intensity (at the radiator, i.e. the burning surface or façade), the maximum permissible configuration factor or critical configuration factor can be derived from the formula:

$$Fi(crit) = Fi'(crit)/p = Icrit/(p \cdot Imax)$$

Where

Fi'(crit) is the critical configuration factor when the selected façade area is radiating;

Fi(crit) is the critical configuration factor when a part p of the selected façade area is radiating;

Icrit is the critical incident radiant intensity at the exposed surface;

Imax is the maximum emitted radiant intensity at the radiating façade;

p is the proportion of net radiating area of the selected façade area.

The program permits 'user-specific' inputs of Imax, the radiator area, and the proportion of net radiating area [in %].

If required, the typical intensity of heat radiation from a burning building 'Imax' can be selected as either 168 kW/m2 or 84 kW/m2. The higher value represents buildings with fire-load values above 25 kg/m2 of wood equivalent. The lower value of 84 kW/m2 can be used in low fire-load occupancies, such as assembly areas and similar, where the specific fire-load doesn't exceed the 25 kg/m2 value. (Reference: M. Law, Fire Research Technical Paper No 5 in 1963).

The program calculates the 'safe distance' between the source radiator and the receiver, at which the Icrit falls to 10, 12.5, 20 40 and 80kW/m2 respectively, with the aid of approximate formulae of Williams-Leir [Ref. Lie]. The application includes surfaces that are not parallel to the plane of the façade of the radiating building.