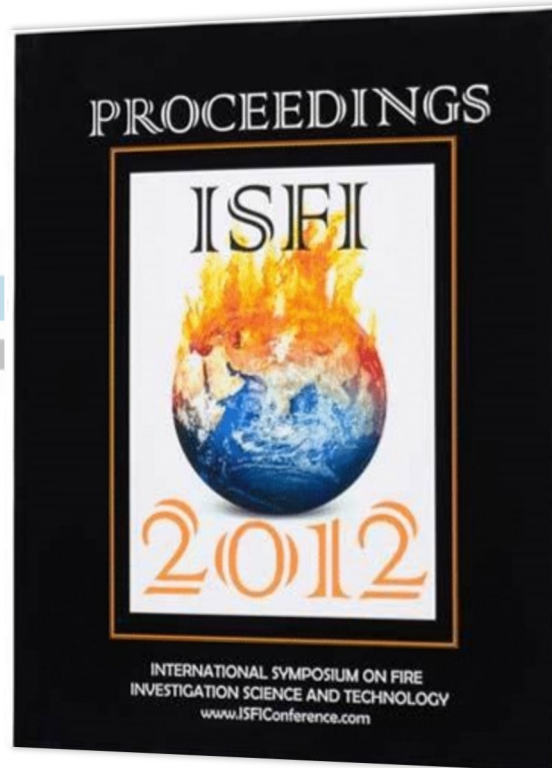


PUBLICATION:

***Applicability and Limitations of Arc Mapping in
Vehicle and Equipment Fire Investigations***

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SYNOPSIS:

Arc Mapping is a commonly accepted method used to determine area of origin, especially in post-flashover structural fires, with properly fused alternating current electrical circuits.

The authors have found that fire investigators and engineers commonly use Arc Mapping as a fire origin investigation technique for non-structural vehicles and commercial equipment. This extends the technique to conditions beyond its originally intended setting, and thus requires consideration of the basis for the technique and determination of the applicability and potential limitations under those different conditions. Numerous features differentiate a typical structure's configuration from that of a typical vehicle or commercial equipment relative to the behavior of their electrical circuits.

This analysis explores some of these differences in typical configurations and discusses their effect on fire behavior, and thus the limitations of Arc Mapping in the fire investigation of vehicles and commercial equipment. Two major results come from this analysis. First, the differences between the structures and vehicles/equipment and their typical electrical systems produce different fire behaviors and thus different fire evidence, including arc marks. Second, is the loss of the degree of predictability of the fire behavior in the electrical systems in vehicles and equipment relative to structures, which leads to a lack of reliability and diminishes the ability of the Arc Mapping technique to assist in vehicle and equipment fire origin determination.