

# WASTE FIRES IN SWEDEN AND RESEARCH FOREFRONTS IN EARLY DETECTION OF WASTE FIRES

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## **Abstract**

In recent years, waste fires have emerged as a serious dilemma for waste management industry at the global level. Incidents of waste fires are common at all stages of waste recycling chain (collection, transportation, middle storage, sorting sites, recovery & recycling plants, waste to energy plants, and landfills) and have grave implications for business, employees, firefighters, society, and environment. Currently, the issue of waste fires is not properly understood. Statistics shows that in Sweden and in USA the cause of half of the waste fire incidents are not known.

Most waste fires are initially subsurface and are of smoldering in nature, which turns into flaming conditions as soon the smoldering front extends close to the surface of pile of the stored material. It is learned from past incidents and from experimental studies that the waste fires spread very rapidly, once ignited. In most waste fire incidents, firefighting operation is very challenging as firefighters are exposed to dangerous chemicals and work under reduced visibility. An early detection (in smoldering stage) could save precious lives, resources and can reduce the environmental burden of waste fire incidents. A key limitation in early detection of waste fires is however that the existing fire detection technologies are effective only for flaming fires and in past, less research was devoted to early detection of smoldering fires.

A first attempt is made to employ electrical resistivity tomography (ERT) for early detection of smoldering fires. ERT is a non-invasive technique in the sense that the detectors need not to be immersed inside the stored pile of material, instead the electrodes can be placed on the surface of the material to be investigated or monitored. The results from initial laboratory scale tests suggest that ERT monitoring can be used successfully as an indicator for identifying the smoldering hotspots in the stored material.

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