

## Energy Recovery from Shredded Waste Railroad Ties

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### **Abstract:**

Railroad ties are produced by treating beech- and oak wood raw ties with creosote in autoclave-drums after the so-called RÜPIG process. About 14 kg of creosote are consumed per impregnated tie, which has a volume of about 0.1 m<sup>3</sup>. Usually the life-time of railroad ties is between 30-40 years, but in the Europeans Union (EU), wooden railroad ties are more and more replaced by concrete ones, resulting in relative large amounts of scrap ties coming on the market for waste management. Due to pollutants like polycyclic aromatic hydrocarbons (PAH) and odor problems, in Austria and other EU countries, scrap railroad ties are classified as hazardous waste, which is expensive to treat and dispose.

In this contribution, energy recovery from shredded waste railroad ties in industrial fluidised bed boilers as well as cement works is reported and the results on flue gas emission measurements and combustion residues analyses are depicted.

Up to 1 tonne/h (i.e. 1,000 kg/h) of shredded scrap ties, particle size < 50 mm, have been fed into fluidised bed at a combustion temperature between 800-900 °C. There was no significant increase in flue gas emissions which could meet the EU as well as national limit values, but a relative high concentration of lead (Pb) was found in bed ash, caused by lead containing metal pieces (embossments) not sufficiently removed during shredder operations.

No significant adverse environmental impacts could be observed when shredded scrap ties have been used as alternative fuel during clinker production in cement works, when around 750 kg/h of this RDF (refuse derived fuel) material was fed at the secondary burner side into the rotary kiln inlet at about 900-1000°C. There was no increase in flue gas emissions and also no impairment of operating conditions and product quality. All the results obtained so far are indicating, that energy recovery from shredded waste railroad ties in cement works and industrial fluidised bed utility boilers is an environmentally sound and economically feasible waste management option.