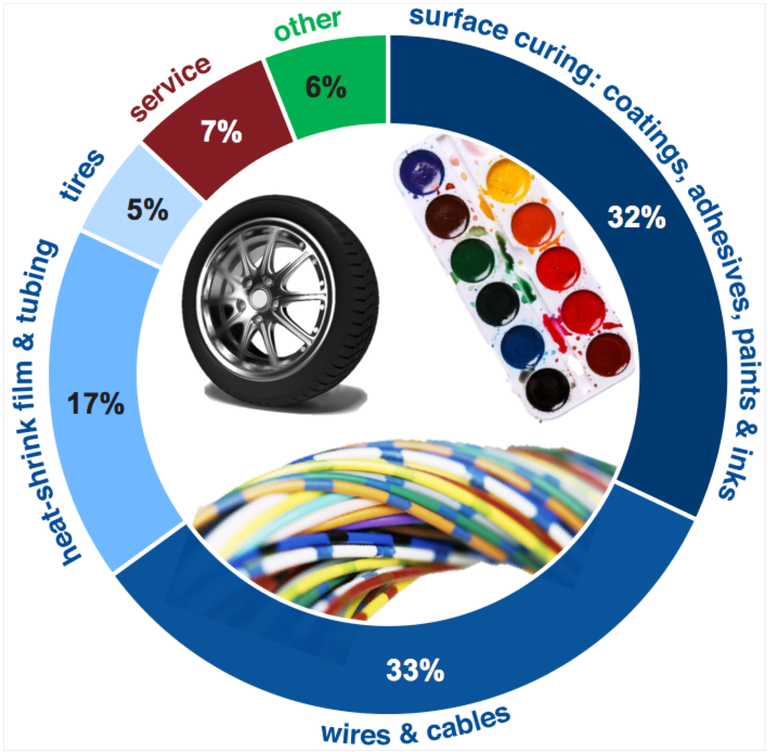
Accelerator Applications Development & Demonstration (A2D2)

Applications of electron beams

Electron beams are an exceptional source of energy that are capable of initiating chemical reactions without the need for catalysts, high temperature or high pressure. The high kinetic energy and penetrating nature of the electrons provide significant benefits over typical chemical methods.



Current End-use Market Distribution of Electron Beam Industrial Applications; 87% of e-beam process involves crosslinking, represented by the applications in blue segments

Image source: IAEA Working Material on Industrial Electron Beam Processing

This technology is currently used in an array of industries and common consumer products. Accelerator sales eclipse $2B annually providing an estimated added value to products worth more than $500B every year.

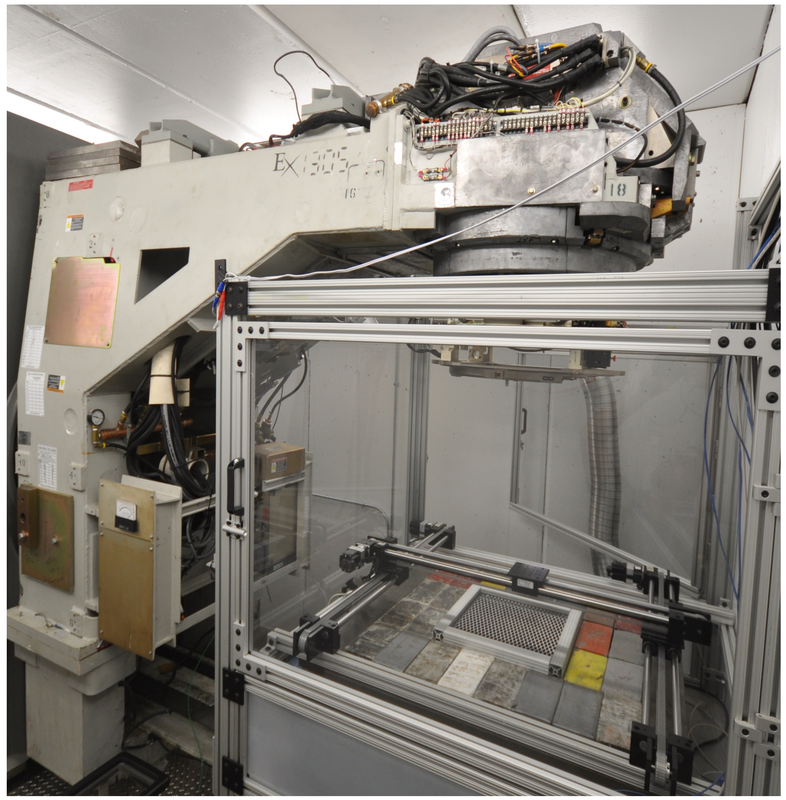
The A2D2 electron accelerator

We have developed new accelerator technologies which enable the application of electron beams to high power regimes.

Targeted use: To conduct proof-of-concept studies for research and validation of these new applications of electron beams.

A2D2 Specifications

Beam Energy	9 MeV
Nominal Beam Power	1.2 kW
Beam Orientation	Vertical
Pulse Width	4.5 usec
RF Frequency	2.8 GHz
Mode of Operating	Pulsed
Dose Rate	0.2 to 1.2 kGy/sec



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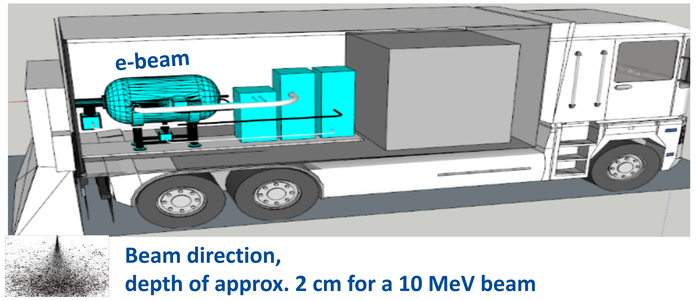
Ongoing work

E-beam initiated curing of pavement



Beam direction, depth of approx. 2 cm for a 10 MeV beam

✓ Enhancing material properties of bitumen by means of electron beam induced polymer modification could reduce or prevent crack initiation and propagation in pavements due to various weather conditions and heavy loads.

Potential Applications

- ✓ **Surface Curing**
- ✓ **Environmental Remediation (water & soil)**
- ✓ **Medical Sterilization**
- ✓ **Phytosanitation**
- ✓ **Advanced Manufacturing**

In A2D2, proof-of-principle work can be done on using electron beams to:

- ✓ **Treat environmental contaminants**
- ✓ **Breakdown biological/chemical agents**
- ✓ **Improve material properties**

Contact

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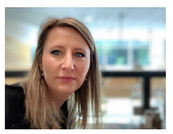

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