

CASE STUDY

My BRISK visit to ECN in the Netherlands



Paula Blanco of Leeds University, UK, takes us through her trip to the Energy Research Centre of the Netherlands (ECN).

from the pyrolysis-gasification of refuse-derived fuel (RDF) and ECN uses the SPA standard method for tar analysis extensively. ECN also has a pilot-scale facility known as a multipurpose thermal converter (WOB), which provided similar experimental conditions to those I was studying during my PhD, offering the opportunity to compare data from my research, gain a better understanding of my results, and identify the effects of working under continuous conditions in a larger rig.

I first heard about the BRISK initiative during the 21st European Biomass Conference and Exhibition in Copenhagen, Denmark, where there was a stand with information about BRISK. I was immediately interested because BRISK Transnational Access represented a great opportunity to acquire additional research experience in a highly specialised institution outside the UK (where I was doing my PhD). It is often very difficult to get funding to conduct research stays outside the host University for international PhD students due to scholarship restrictions.

The application process was easier than I expected. I contacted Dr. Luc Rabou at ECN who helped me both in developing the research proposal and with more general queries I had about my stay. After discussing the research proposal with Dr. Rabou and with my PhD supervisor Professor Paul Williams at Leeds, I submitted my application and in less than a month I received approval.

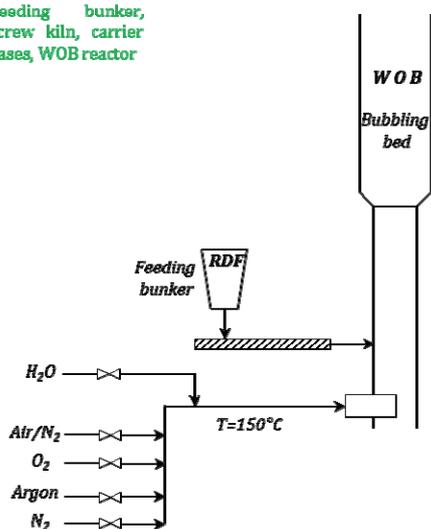
I decided to apply to visit the Energy Research Centre of the Netherlands (ECN) because my PhD research involved tar analysis from syngas coming

My Visit

The research stay involved one week of experiments using the WOB reaction system to process solid waste materials in the form of refuse-derived fuel pellets at gasification temperatures of around 750°C in order to obtain syngas. A bed of olivine was used in order to promote tar cracking reactions. The aim was to learn and understand

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SECTION ONE:
Feeding bunker,
screw kiln, carrier
gases, WOB reactor



SECTION TWO:
Cleaning system,
gas and tar
sampling, on-line
gas analysis

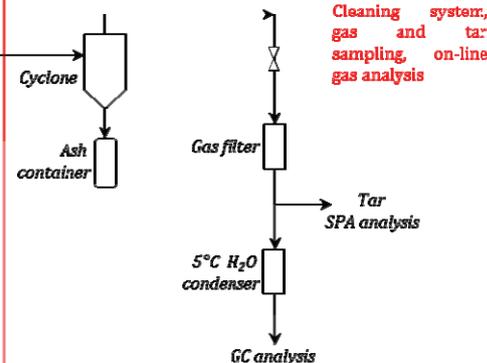


Figure 1: Flow diagram of the WOB fluidised bed gasification system.

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the SPA method for tar collection, and to obtain tar samples for further analysis. Using a large scale continuous fluidised bed system will enable a scale-up comparison of the gas and tar composition and the results obtained using a small scale bench reactor at the University of Leeds in the UK. The variation of some operational conditions such as the gasification temperature, RDF feeding rate, carrier gas mixture, and steam flow rate were also studied during the experiments.

This was an enriching experience for me because I had the chance to compare how different experimental and analytical techniques are used both in academia and in industry, and to work with well-experienced researchers in the area of gasification. From a wider perspective, tar analysis has been one of the major challenges facing the thermal processing of solid wastes. The comparison of tar reduction and composition from a small scale reactor and a larger scale process (WOB system) represented an important comparison between small scale and larger scale experiments and the data was useful for work on my thesis. The creation of links between universities and diverse companies and institutes is a great opportunity for people working in topics related to biomass gasification to extend our vision.

Acknowledgements

I want to express my gratitude to my hosts Dr. Luc Rabou and the ECN technicians who dedicated their time to helping me. I also want to thank my PhD supervisor Professor Paul T. Williams at the University of Leeds for his support during the application process.



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Figure 2: Preparation of RDF pellets to be fed into the WOB reactor: original 4x1.5cm (left); processed 4x3mm (right).

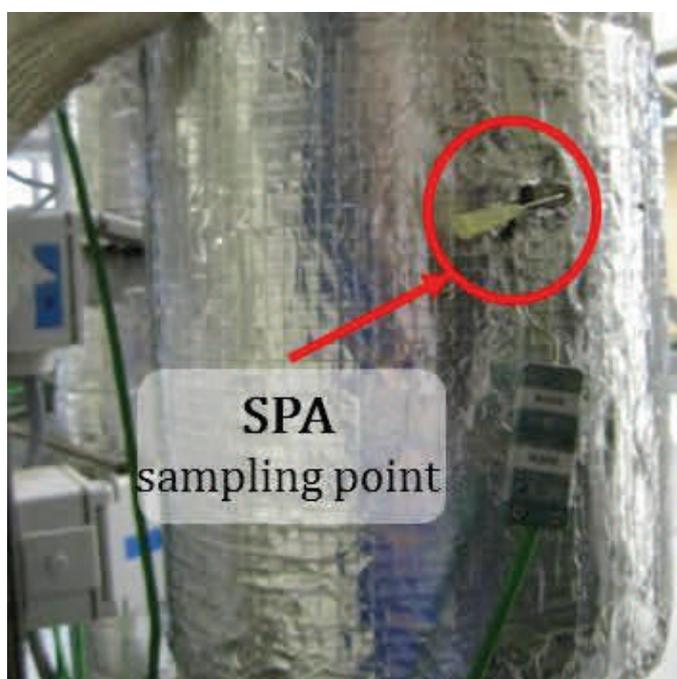


Figure 3: Hot gas filter and location of the SPA tar sampling point.

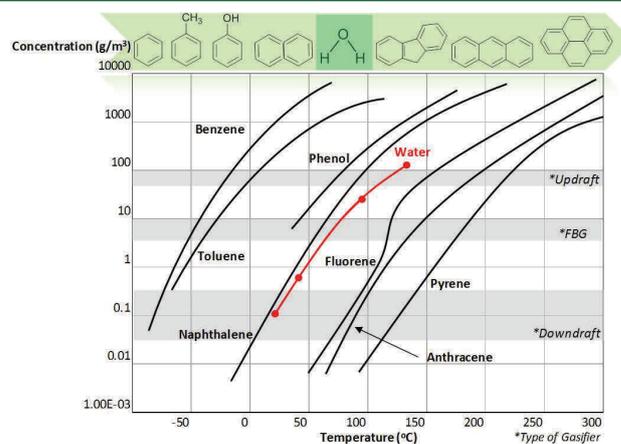


Figure 4: Variation of tar compounds dew point and concentration according to the temperature and gasifier type.