



## Adhesion Strength of Biomass Ash Deposits

Laxminarayan, Yashasvi; Jensen, Peter Arendt; Wu, Hao; Bøjer, M.; Jappe Frandsen, Flemming; Glarborg, Peter

*Published in:*  
Proceedings of 24th European Biomass Conference & Exhibition

*Link to article, DOI:*  
[10.5071/24thEUBCE2016-2BV.1.49](https://doi.org/10.5071/24thEUBCE2016-2BV.1.49)

*Publication date:*  
2016

*Document Version*  
Publisher's PDF, also known as Version of record

[Link back to DTU Orbit](#)

*Citation (APA):*  
Laxminarayan, Y., Jensen, P. A., Wu, H., Bøjer, M., Jappe Frandsen, F., & Glarborg, P. (2016). Adhesion Strength of Biomass Ash Deposits. In *Proceedings of 24th European Biomass Conference & Exhibition* <https://doi.org/10.5071/24thEUBCE2016-2BV.1.49>

---

### General rights

Copyright and moral rights for the publications made accessible in the public portal are retained by the authors and/or other copyright owners and it is a condition of accessing publications that users recognise and abide by the legal requirements associated with these rights.

- Users may download and print one copy of any publication from the public portal for the purpose of private study or research.
- You may not further distribute the material or use it for any profit-making activity or commercial gain
- You may freely distribute the URL identifying the publication in the public portal

If you believe that this document breaches copyright please contact us providing details, and we will remove access to the work immediately and investigate your claim.

## Adhesion Strength of Biomass Ash Deposits

Short introductory summary:

Ash deposition on boiler surfaces, especially on convective pass tubes, is a major problem encountered during biomass combustion, hindering heat transfer to the steam cycle. Therefore, regular removal of ash deposits is essential for optimal boiler operation. This study investigates the shear adhesion strength of biomass ash deposits on superheater tubes. Artificial biomass ash deposits were prepared on superheater tubes and sintered in an oven at temperatures up to 1000°C. Subsequently, the deposits were sheared off with the help of an electrically controlled arm. Experiments were performed to analyze the effect of sintering temperature, ash composition, measurement temperature, sintering duration, ash particle size and steel type. In addition to investigating fly ash obtained from biomass boilers, model ash mixtures were developed to understand the effect of different ash components (K, Si, Ca, etc.) on deposit adhesion strength.

Presenter: **Yashasvi LAXMINARAYAN, Technical University of Denmark, Chemical and Biochemical Engineering Dpt., Kongens Lyngby, DENMARK**

Presenter's biography:

Yashasvi Laxminarayan is a PhD student at the Technical University of Denmark, with particular interests in biomass combustion, ash deposition and removal in boilers. He holds a Master's degree (cum laude) in Chemical engineering from TU Eindhoven.

*Biographies and Short introductory summaries are supplied directly by presenters and are published here unedited*

Co-authors:

Y. Laxminarayan, Technical University of Denmark, Kongens Lyngby, DENMARK  
P. A. Jensen, Technical University of Denmark, Kongens Lyngby, DENMARK  
H. Wu, Technical University of Denmark, Kongens Lyngby, DENMARK  
M. Bøjer, DONG Energy, Gentofte, DENMARK  
F.J. Frandsen, Technical University of Denmark, Kongens Lyngby, DENMARK  
P. Glarborg, Technical University of Denmark, Kongens Lyngby, DENMARK

Session reference: 2BV.1.49

Subtopic: 2.3 Biomass combustion in large utilities

Topic: 2. BIOMASS CONVERSION TECHNOLOGIES FOR HEATING, COOLING AND ELECTRICITY