

HU-ACE NEWS LETTER

Advanced Core for Energetics, Hiroshima University

Vol. **50**
2021.2**Activities of the Core**

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| Feb. 9, 2021 | The 92nd Hiroshima University Biomass Evening Seminar (co-organized) |
| Feb. 18, 2021 | The 56th HU-ACE Steering Committee Meeting |

We held a plenary session for the entire center.

On January 27, 2021, the plenary session of HU-ACE was held online. The purpose of this meeting was to confirm the status of operations, exchange opinions among members of the base, and share the direction of our activities. At the same time, awards were given for the publication of treatises. At this center, three categories of commendations are given for papers registered in 2020. This time, Professor Nishida, Professor Ichikawa, and Professor Johzaki were awarded in the number of papers category, and Professor Nishida, Assistant Professor Luo and Assistant Professor Singh were awarded in the increase in number of papers category, and Assistant Professor Kanna and Assistant Professor Singh were awarded in the thesis increase rate category. For reference, the graph of the number of papers from 2012 to 2020 is attached below. After establishment of this center in 2017, number of publication increase is clear.

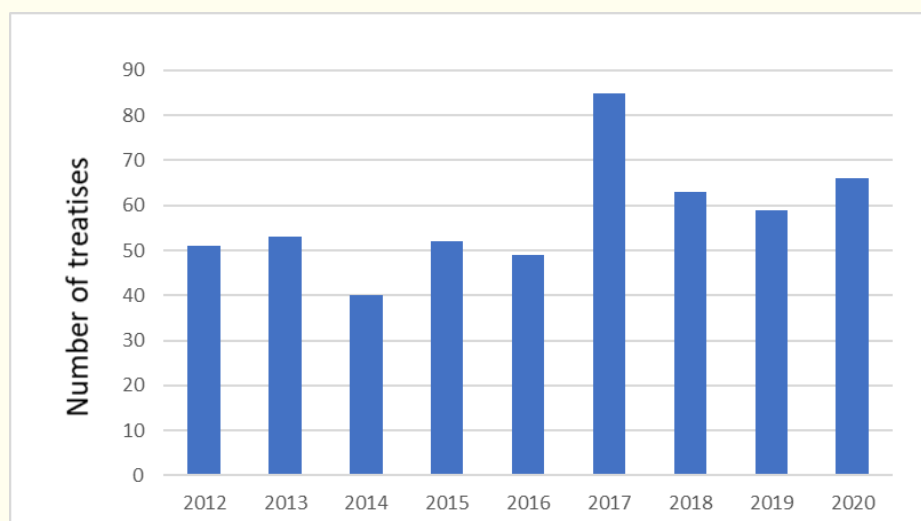


Figure: Changes in the number of treatises over time



Issued by Advanced Core for Energetics, Hiroshima University

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Research Field: Power Generation

Keyword: liquid atomization; combustion; thermal power generation; environmental engineering

Abstract

Gas turbine combined cycle (GTCC) power plants, from which less CO₂ is emitted compared with coal combustion, are attracting much attentions as coal-fired alternatives, and are becoming increasingly popular all over the world. The fuel for the GTCC in Japan is LNG, but light oils are often used in overseas plants. In some types of oil-fired GT combustors, the conventional method is that an oil column is injected through a single hole, and the column is atomized in crossflow (combustion air flow). Many researches have carried out research to investigate the properties of oil column in crossflow. But the conventional technique has much space for improvement. I am now challenging for a new twin-fluid injection method instead of the conventional liquid column injection. In the twin-fluid injection method, a two phase-mixture jet is injected from an injection hole. Due to Professor Nishida's leadership and graduate student Ms. Wenjing Xing's efforts, many features of the twin-fluid injection are revealed to be excellence in atomization, penetration of spray jet into crossflow, and fairly-wide dispersion into crossflow.

I received my Ph.D. degree in 1984, and the theme was with respect to liquid atomization. Thinking of it, liquid atomization is said to be starting point of my life as a researcher and engineer. I have a dream to re-examine liquid atomization, in particular twin-fluid atomization from new viewpoints.

As a corporate research engineer in Babcock Hitachi and Mitsubishi Power, I have been conducting research in various themes relating to energy and environment such as coal, biomass, gasification, catalyst, and CO₂ conversion. I want to make use of my experiences to develop HU-ACE, even if it is in a small way.

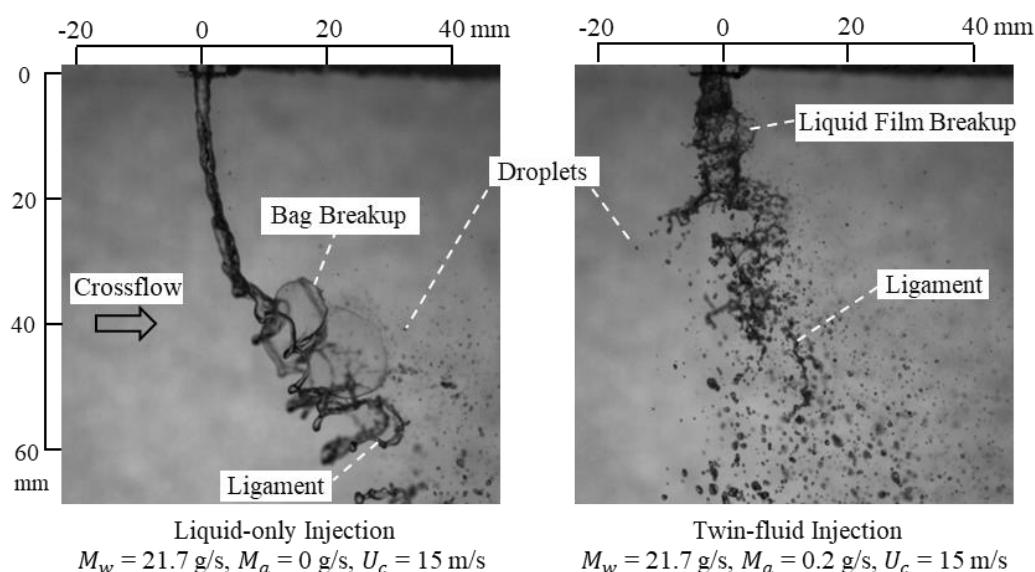


Figure: Liquid jet behaviors injected into crossflow