



Experiments and modelling of the spread of fire between containers on board a container ship

Eiriksson, Asgrimur; Husted, Bjarne P.; Markert, Frank

Publication date:
2023

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

[Link back to DTU Orbit](#)

Citation (APA):
Eiriksson, A., Husted, B. P., & Markert, F. (2023). *Experiments and modelling of the spread of fire between containers on board a container ship*. Abstract from 14th International Symposium on Fire Safety Science, Tsukuba, Japan.

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.

1 Experiments and modelling of the spread of fire between containers on board a container ship

2 Ásgrímur Eiríksson^a, Bjarne P. Husted^{ab*}, Frank Markert^a

3 ^aTechnical University of Denmark, Brovej 118, 2800 Kgs. Lyngby, Denmark

4 ^bDanish Institute of Fire and Security Technology, Jernholmen 12, 2650 Hvidovre, Denmark

5 * Corresponding author, bphu@dtu.dk

6 **Keywords:** container ship, fire spread, fds, experiments

7 Abstract

8 Historical fire scenarios aboard container ships have proven extremely dangerous and complicated. In the past
9 decades, container transport has increased drastically; therefore, container ships' capacity has more than tripled
10 since 1996. The spread of fire from a burning container to adjacent containers in a cargo compartment aboard
11 a container ship has been studied [1].

12 Fire incidents are increasing, especially in the larger
13 vessels, and indications are that the fire extinguishing and
14 fire detection systems have not kept in phase with the
15 vessel's enlargements [2]. Therefore, knowledge of the fire-
16 spreading mechanism is one of many essential parts in
17 increasing safety aboard container ships.

18 The study consists of experimental fire studies of parts from
19 a container, including the door and flooring. Further,
20 computational fluid dynamic modelling using the computer
21 program Fire Dynamic Simulator (FDS). The objectives
22 were to study heat transfer from a burning container to
23 adjacent containers and predict possible fire-spreading
24 mechanisms using experimental data and findings to
25 support the numerical simulation of the container fire.

26 The results indicate that exposing temperatures of a
27 burning container with a certain heat release rate can
28 spread to adjacent containers, see Figure 1 and Figure 2.
29 However, ignition inside the adjacent containers will
30 depend on the material being transported and the
31 condition of the container.

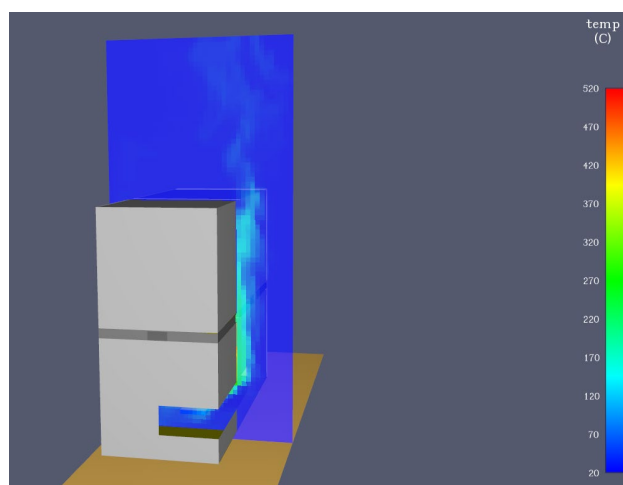


Figure 1 Initial model of the burning container and temperature slice showing influence on the container above

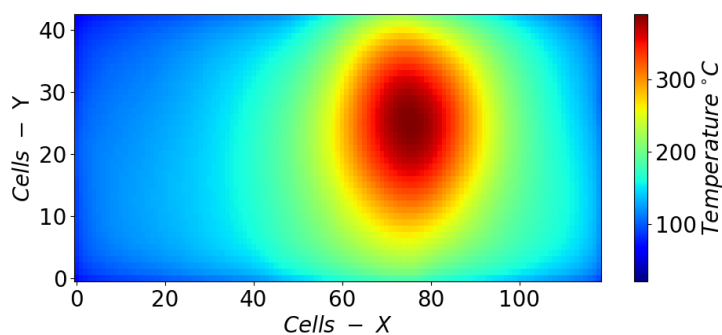


Figure 2 Color map of the exposed surface of the plywood flooring

37 References

- 38 [1] Á. Eiríksson, 'Experiments and modelling of the spread of fire between containers on board of a
39 container ship', MSc, DTU Department of Civil and Mechanical Engineering, Lyngby, Denmark, 2022.
40 [2] Transport Safety Investigation Bureau, 'Fire on board Maersk Honam at Arabian Sea on 6 March 2018',
41 Ministry of Transport Singapore, Singapore, MIB/MAI/CAS.035, Oct. 2020.