



2ND INTERNATIONAL SYMPOSIUM K-FORCE 2019

Tirana, September 9, 2019

MANAGING THE FIRE RISK IN THE OILSEEDS STORAGE

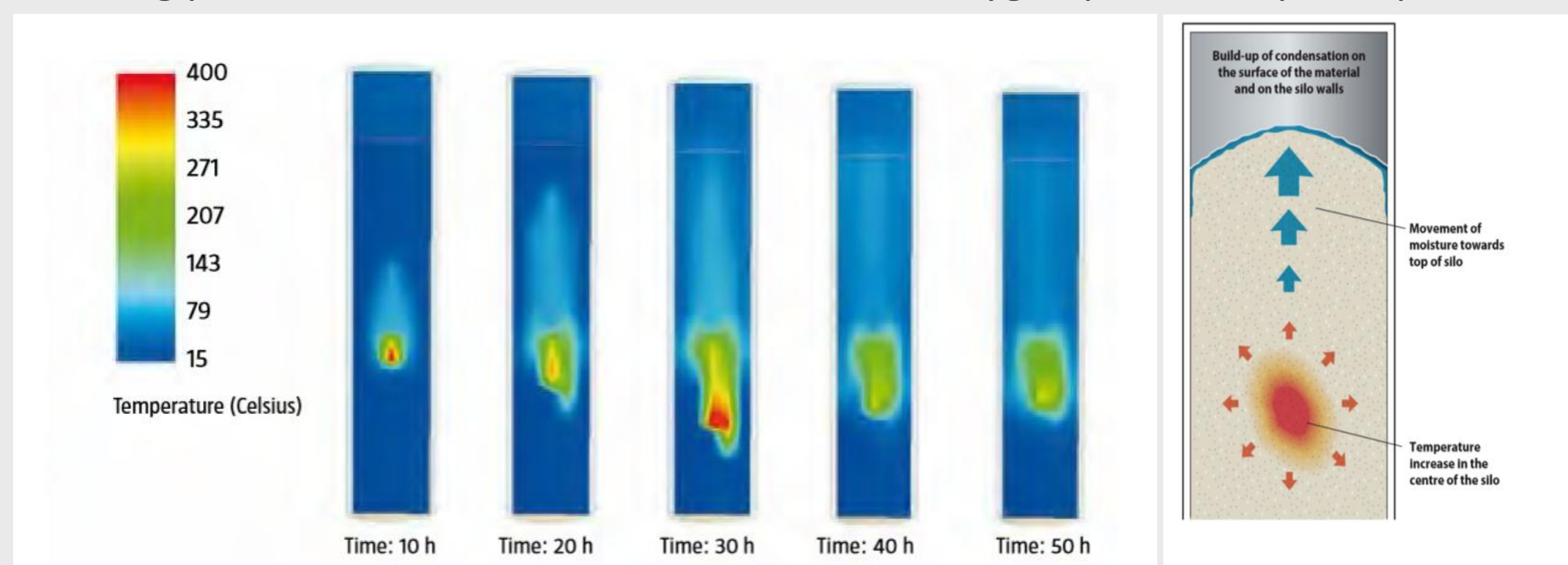
INTRODUCTION

Dangers of fire outbreak during processing and storing of oilseeds can be pronounced if proper protective measures aren't taken. There's a great risk of self-heating and spontaneous combustion of the oilseed mass during storage in silos due to inadequate and unprofessional management of the technological process. Since spontaneous combustion can result in smoldering fires which are exceptionally difficult to extinguish, understanding and preventing this process is of great importance. This article will explain the factors that influence the start and intensity of initial processes. Physicochemical parameters and minimal temperatures for example seed ignition will be determined in the lab, with the purpose of finding key causes of fire outbreaks, and presenting the solution for reducing the risk of fire outbreak.

CORE IDEA OF THE RESEARCH

The greatest danger to silos and other oil storage facilities is the possibility of self-heating, ie. spontaneous gradual accumulation of heat in stored mass. The self-heating process is characterized by two phases:

- Initial phase, the seed is heated to 60-70°C (this phase is initiated by micro-organisms, germination and oxidation process);
- Heating phase, in which both oxidation and non-oxygen processes participate.



The physicochemical parameters and minimum ignition temperature of the ground samples of soybean, sunflower and rapeseed were tested on three samples taken from the technological process of oil production.

Parameter (% m/m)	Oilseed rape	Soybean	Sunflower
Moisture	5,82-6,40	8,62-9,30	5,73-5,80
Cinders	3,31-3,61	4,50-4,59	2,74-2,91
Volatiles	89,09-90,76	85,81-87,31	87,86-90,31
Flammable carbon	8,40-9,82	11,01-12,23	8,86-11,09

For all the oilseeds tested, the minimum ignition temperatures within 30 min were in the range of 240-270°C, i.e. the following results were obtained:

- The ignition temperature of ground rapeseed ranged from 250-270°C;
- The ignition temperature of ground soybean seeds was 250°C for all three samples;
- The ignition temperature of ground sunflower seeds ranged from 240-250°C.



When storing oilseeds in silos, self-heating can occur, viz. spontaneous gradual accumulation of heat within the stored mass. Experience says that human omissions are the most common cause of fire, irresponsible behavior, but also lack of knowledge of storage technology and the explosive characteristics of oilseeds in the silo. Modern silos offer many solutions for early detection of temperature rise within the stored mass, as well as monitoring of fire risk. The paper presents the most significant influencing factors on the occurrence of self-heating of stored mass of oilseeds and some of the preventive measures for safe storage. The optimal humidity for storing oilseeds ranges between 7 and 10%. Experimental investigation of ground oilseeds from technological process has determined minimum ignition temperatures in the range of 240-270 °C. In order to manage fire risk in an oilseed storage facility, it is very important to assess the fire risk, identify the areas at risk, and to act preventively with all available technologies.

The European Commission support for the production of this publication does not constitute an endorsement of the contents which reflects the views only of the authors, and the Commission cannot be held responsible for any use which may be made of the information contained therein.

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Co-funded by the
Erasmus+ Programme
of the European Union

