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Grains: Incorrectly applied fumigation pellets caused explosion

A bulk carrier loaded bulk grain in the US Gulf. The cargo was fumigated on completion of loading with the fumigator applying aluminium phosphide pellets to the surface of the cargo. The fumigation documents stated that the fumigation was a subsurface application with the aluminium phosphide applied evenly across the hold.

Explosion

Shortly after departure there was an explosion in one of the holds and the hatch cover was partially displaced. The crew then ventilated the other holds as a precaution.

Incorrect application

After the explosion, it was determined that the fumigant was only applied to the cargo surface from the hatch covers in two distinct longitudinal lines. This was evident from the fumigant residue in the other holds. The fumigant pellets were poured from buckets and there were piles of pellets visible on the cargo surface in direct contradiction to the fumigation manual application methods which advises that piles of fumigant should be avoided.

In addition to the structural damage to the vessel, the damage to the hatch cover meant that poor weather conditions caused cargo damage, despite the crew's attempts to cover the displacement caused by the explosion.

What can we learn?

- It is important to ascertain:
 - The fumigation application method and check that it corresponds to the information provided in the fumigation documents or certificate.
 - The type of fumigant, the formulation (pellets, tablets ...) and brand of the fumigant.
 - The type of recirculation fan (if used).
 - The quantity of fumigant being used in each hold.
 - The distribution of the fumigant on the cargo.
 - The type of gas filter provided with any gas masks or PPE.
- In this case the fumigation pellets were applied incorrectly. A diligent Master needs to ensure that the fumigator's instructions are carefully followed to ensure that in transit fumigations are performed without undue risk.
- The Master and the crew should familiarise themselves with proper fumigation practice and maintain a detailed record of how the fumigation is carried out.