Green Inland Ports

Good Practices

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Minimising spills during handling of dry bulk

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1.1 Description

Some ports, such as the North Sea Ports, the port of Novi Sad and the port of Seville have grain terminals. Grain terminals are large storage, processing and distribution centres and often have several specialised silos, bins and storage rooms to temporarily store the grains. These terminals are usually located close to major rail, road and sea transport hubs (Menon, H., 2024).

According to the World Bank Group, (2014), the world will need to produce at least **50% more food** by 2050 to feed all people worldwide, despite agriculture being more vulnerable to climate change than any other sector. A warming climate could reduce crop yields by more than 25%. Almost 70% of freshwater is used for agriculture worldwide and climate change has an impact on freshwater supplies.

Unfortunately, a lot of grain is spilled in grain terminals during cargo handling. Careless handling attracts birds, leading to major problems (Ćulafić, V., 2023). Some examples of these problems include (Caliboso, F. M., n.d.):

- Birds may settle on top of piles of grain and peck holed in woven bags to reach the food inside. This can lead to spillage, and in extreme cases, collapse of the pile;
- Birds will roost and nest in large buildings unless access is completely restricted. In a warehouse, birds may damage screens to get inside;
- Nests in gutters and downspouts can cause blockages and lead to flooding and water damage to property;
- Birds host lice and mites that can become pests to workers when birds nest in buildings;
- Nesting materials provides shelter and breeding ground for various harmful insects;
- As a result, bird droppings, feathers and dead rotting birds, food, packaging and handling facilities can become contaminated. Droppings can be contaminated with food poisoning bacteria such as salmonella and are also a major source of infection for other diseases.

An important step to address the challenges of future global food production is to ensure that spills in grain handling systems are prevented and minimised, at every stage of the logistic chain. Unlike some other sectors, such as container shipping, a small percentage of grain loss is often accepted during loading and discharge operations. To prevent spills, terminals, cargo owners, shippers and receivers must all conduct their operations carefully. This will simultaneously ensure that dust generation is minimised, which in turn has a positive effect on local air quality (Göransson, P., 2017).

Collected grain spills can be offered to third parties (such as livestock farmers), so that the grain does not end up as waste but can be reused. Grain spills can also be used to produce biomass by companies in the port area, as is already happening in the port of Sevilla.

CE Delft (2024) has conducted a study on the minimisation of nutrient losses in ports in the Baltic Sea. The report contains the best available technologies and environmental practices for dry bulk fertilizer storage and handling. Although the study deals with a different type of cargo, many of these good practices can also be used for the storage and handling of grain.

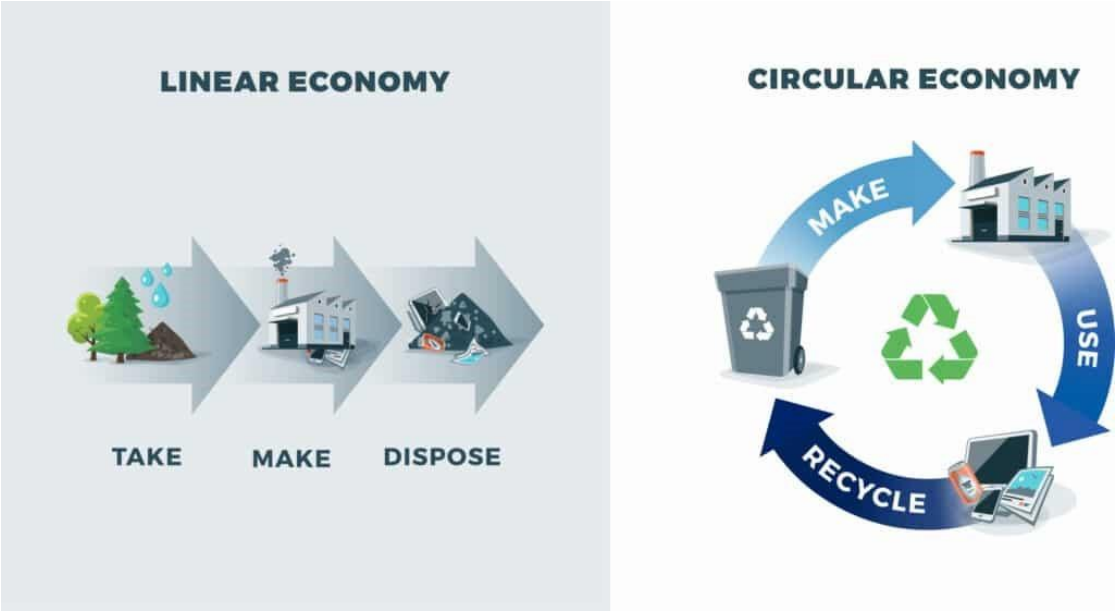
1.2 Aim

The goal of this good practice is twofold, namely:

- Prevent spillage during the storage and handling process;
- Ensure that spills do not lead to waste, but that value can still be generated, for example by donating the spillage to companies that can use the residues.

This good practice can also make a positive contribution to a circular economy, where the lifespan of products becomes a loop rather than a line that eventually ends. Figure 1 provides an illustration of this.

Figure 1 - Schematic illustration of a linear economy versus a circular economy.



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1.3 Ports collectiong grain spills to be used by others

- Port of Gyor-Gonyu
- HAROPA Port
- Port of Seville

1.4 Stakeholders

- Port authority: A port authority can impose rules regarding (grain) spillage and cleaning. Moreover, dust formation can also be detrimental to other terminals and businesses within port areas due the reduction in air quality.
- The grain terminal: Handling and storage take place within the grain terminal. This means that most of the grain losses happen in and around the grain terminal. Grain terminals can

implement the most good practices to minimise grain losses, clean up spills and promote reuse.
- Cargo ship: The ship transports the grain and can also implement good practices to minimise grain spills.
- Cargo owner: Loss of grain the detrimental to the owner of the grain.
- Company that can use the grain spills: They can buy the grain spills at a relatively low price to use it for their own purposes, which benefits them.

1.5 Voluntary or mandatory

This good practice is voluntary unless the government or port authority does not impose rules on grain handling. Currently, there are no rules requiring stakeholders to minimise grain spills and recycle of the residue. However, the European Commission is working on a **"Circular economy action plan"**, to ensure less waste and will therefore target sectors that use the most resources and have potential for circularity, such as water and nutrients (EC, n.d.). These efforts may become mandatory in the near future

1.6 Realised/potential impact

The Port of Seville estimates that grain spills come to around 120 tonnes per year. Collection of the residue is included in the general waste management plan and will be used for composting and generating biomass or fodder if the grain spills are of good quality.

1.7 Possible obstacles

- For certain purposes, grain must be of sufficient quality to be used. The location where the grain is spilled can make a lot of difference to its quality. In certain cases, grain spills may not be suitable anymore for human consumption but may be suitable for other purposes.

1.8 Key learnings

- Minimising spillage during grain handling has several positive impacts, because:
    - Less spillage results in a lower demand for grain production, leading to more efficient use of resources
    - Less spillage attracts fewer birds that can act as pests.

1.9 Sources

Caliboso, F. M. n.d. Birds as pests of grain stores, https://www.fao.org/4/x5048e/x5048E0g.htm#:~:text=Grain%20spilled%20by%20careless%20handling,on%20the%20surface%20of%20stocks.

CE Delft, 2024 .Minimisation of nutrient losses in ports in the Baltic Sea, Delft: Netherlands**.**

Ćulafić, V., 2023. Interview port of Novi Sad.

EC. n.d. Circular economy action plan, European Comission https://environment.ec.europa.eu/strategy/circular-economy-action-plan_en.

Göransson, P., 2017. Grain handling systems in port to meet future food demands, London: UK.

Menon, H. 2024. What are Grain Terminals?, https://www.marineinsight.com/ports/what-are-grain-terminals/.

World Bank Group, 2014. About the Agriculture Global Practice, Washington D.C.: US.