The Advantages of Vertical Silos

Presented to

Food and Agriculture Organization of the United Nations & Egyptian Delegation

2nd November 2018
Silos Cordoba Business Group
The Company

**Silos Córdoba** was founded by Juan López Liétor in 1975 with the aim of fulfilling the needs of the Spanish livestock market through grazing and storage solutions.

**International Expansion**

Over the past 20 years, the company has experienced a steady international expansion:

- Local distributors in 26 countries around the world,
- Affiliate companies in Argentina, Brazil, Uruguay, Romania, Russia, Kazakhstan, Turkey, Egypt, Nigeria, Mozambique, India.
- We export our products to over 52 countries in 4 continents.
## The Company - Key Figures

<table>
<thead>
<tr>
<th>Metric</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Turnover (€)</td>
<td>50,002,921</td>
</tr>
<tr>
<td>EBITDA (€)</td>
<td>2,736,429</td>
</tr>
<tr>
<td>Employees</td>
<td>178</td>
</tr>
<tr>
<td>Countries</td>
<td>52</td>
</tr>
<tr>
<td>Invested in a new factory (€)</td>
<td>15,000,000</td>
</tr>
<tr>
<td>Years of experience</td>
<td>43</td>
</tr>
<tr>
<td>Turn-key projects worldwide</td>
<td>1,000</td>
</tr>
<tr>
<td>Silos installed</td>
<td>20,000</td>
</tr>
</tbody>
</table>
Our goal is Customer Satisfaction

The Company

What we do?

Today, we offer a wide range of products and services worldwide:

- Conception, planning, design and assembly of agribusiness facilities
- Manufacturing of silos
- Manufacturing of grain conveying and handling systems
- Livestock material
- Feed mills
- Manufacturing of metal structures and claddings

How we do it?

- Personalized solution
- Experts on project development
- Experts on facility assembly
- Quality up to delivery
Organization within Business Units

To better seize the infrastructures and experience of the group, we have organized the operations in specialized units:

- **Engineering, development and assembly of facilities for industrial and agricultural purposes.**
- **Development and manufacturing of industrial conveying machinery.**
- **Design and supply of all kinds of facilities for the manufacture of feed.**
- **Manufacturing and sale of products for all sorts of livestock facilities: pork, poultry, sheep, cattle, alternative livestock…**
Manufacture and distribution of climate control systems for livestock and industry.

Supply and installation of all kind of metal claddings. Modular homes with customized panels.

Manufacture of steel structures in welded and bolted system, with the best machines in steel transformation.
Business Units

Primary foundations of Silos Córdoba

1975: Juan López Liétor S.L.
1999: SILOS CORDOBA
2001: Gandaria
2011: Quinta Metalica
2014: GER
2016: MATRA

Diversifications towards added-value activities
The Advantages of Vertical Silos
The Advantages of Vertical Silos

FAO statement 1: There are clear technical and socio-economic reasons why the metal silo is suitable for food security. As is known, the heaviest losses occur during the grain post-production phase, especially in developing countries and during storage. These losses are mainly due to the use of traditional storage (1)

FAO statement 2: It offers a series of advantages and benefits:

1. it maintains the quality of stored product;
2. it is airtight and permits effective non-residual fumigation;
3. it avoids the use of insecticides;
4. it requires little space
5. it reduces losses to virtually nil;
6. it enables farmers to take advantage of fluctuating grain prices;
7. it prevents rodents and other pests that can harm consumer health;
8. it is easy to use, profitable and an effective tool against poverty;
9. it is inexpensive and can last for more than 15 years, if properly maintained;
10. it can be built in situ with local labour;
11. it is a form of decentralized storage;
12. it is a tried-and-tested technology in several countries. (2)

(2) FAO.org
Silo Technology

Idea: “Silo by itself is nothing” (1)

Benefits come through the proper management of silo technology.

Where to focus to get all silo advantages?

1. Reception
2. Cleaning
3. Drying
4. Storing
The three major factors affecting the grain storage:

- **Moisture content.** Grain: usually harvested with a moisture content of ≈ 25%
- **Temperature and** Key for avoiding infestation
- **Storage period** The shorter the safest

**Ideas:** “keep the grains clean, dry, healthy and without mechanical damage. How? Keeping the grain “living” with the lower damage possible.”

*Storage technologies don’t do anything by themselves. Proper management has to be done by the user.*
Grain is coming to the storage plant by bags or bulk, in trucks, trains or vessels.

Before unloading: Take samples for measuring:
• Temperature
• Moisture content
• Percentage of impurities

Grain laboratory will easily analyze the grain conditions.

During unloading: it is recommendable an aspiration system. In some countries is even mandatory.

Some aspects regarding this system should be consider:
• Pit intake dimension
• Receiving capacity
• Aspiration volume
• Installed inside a building / cover
Cleaning is the process that removes foreign particles from the bulk.

Cleaning has to be studied in order to install the complete cleaning process adapted for the grain.
Drying is the process that reduces grain moisture content to level where it is safe for storage.

Initial factor: at harvest time grain tends to contain high MC.

- Natural respiration + high MC + High temperature
- Development of insects and molds
- Higher temperature & higher respiration
- Better conditions for insects and molds
Silo Technology - STORING:

Traditional methods of grain storage:

- Ware house – gunny bags stacked
- CAP – Covered and Plinth in open space
- Silos – Bulk grain stored in silos

- Concrete silos
- Galvanized steel
- Silo Bag
Silo Technology - ADVANTAGES:

1. Maintains the quality of stored product
2. **Watertight** and airtight structure: non-residual fumigation, **no mycotoxins**
3. Avoids the use of insecticides, **if properly managed**
4. Requires less space
5. Reduces losses to virtually nil
6. Take advantage of fluctuating grain prices
7. Prevents rodents and other pests entrance
8. Easy to use, profitable and an effective tool against poverty
9. Inexpensive related with longer useful life, if properly maintained
10. Built in situ with local labour
11. Decentralized storage
12. **Labour Management**
13. Tried-and-tested technology in several countries.
## Silo Technology - **STORING:**

<table>
<thead>
<tr>
<th>Features</th>
<th>Steel Silos</th>
<th>Concrete Silos</th>
<th>Warehouse</th>
<th>Silo Bags</th>
</tr>
</thead>
<tbody>
<tr>
<td>STORAGE</td>
<td>Bulk</td>
<td>Bulk</td>
<td>Bulk or bags</td>
<td>Bulk</td>
</tr>
<tr>
<td>RETRIEVAL</td>
<td>First-in, First-out</td>
<td>First-in, First-out</td>
<td>Last-in, First-out</td>
<td>Depending of the needs.</td>
</tr>
<tr>
<td>WASTAGE</td>
<td>Less than 1%</td>
<td>Less than 1%</td>
<td>Could be up to 34 %</td>
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</tr>
<tr>
<td>GRAIN QUALITY</td>
<td>Control by Temp. monitoring system, Aeration, PLC, etc.</td>
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<td>Possible but not accurate</td>
<td>None</td>
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<tr>
<td>INFESTATION</td>
<td>Practically nil</td>
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<td>Open to attack by birds, rodents, termites, pets, fungi, mold, fermentation, etc.</td>
<td>Fungi, mold, fermentation, insects, et.</td>
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<tr>
<td>GRAIN LIFE*</td>
<td>At 12% mc storage &amp; low temperature. Long period</td>
<td>At 12% mc storage &amp; low temperature. Long period</td>
<td>Much lesser</td>
<td>Unpredictable</td>
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<tr>
<td>SPACE REQUIREMENT</td>
<td>Vertical storage, less space</td>
<td>Vertical storage, less space</td>
<td>Horizontal storage, more space</td>
<td>Horizontal storage, more space</td>
</tr>
<tr>
<td>DESIGN</td>
<td>Simple design, simple to erect</td>
<td>Complicate: rebar placement, concrete quality, longer commissioning</td>
<td>Simple</td>
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<tr>
<td>OPERATIONAL COST</td>
<td>Lower (initial investment)</td>
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<td>Higher- (Manual-semiautomatic)</td>
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<td>FOUNDATION COST</td>
<td>Medium – high</td>
<td>High</td>
<td>Medium</td>
<td>none</td>
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<tr>
<td>Insects</td>
<td>Growth temperature (range)</td>
<td>Appearance</td>
<td></td>
<td></td>
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<tr>
<td>----------------</td>
<td>----------------------------</td>
<td>------------</td>
<td></td>
<td></td>
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<tr>
<td>Grain weevil</td>
<td>15 – 35 °C</td>
<td><img src="image1" alt="Grain weevil" /> <img src="image2" alt="Grain weevil" /></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rice weevil</td>
<td>17 – 38 °C</td>
<td><img src="image3" alt="Rice weevil" /> <img src="image4" alt="Rice weevil" /></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Borer</td>
<td>20 – 32 °C</td>
<td><img src="image5" alt="Borer" /> <img src="image6" alt="Borer" /></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Flour moth</td>
<td>15 – 28 °C</td>
<td><img src="image7" alt="Flour moth" /> <img src="image8" alt="Flour moth" /></td>
<td></td>
<td></td>
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<tr>
<td>Flour beetle</td>
<td>22 – 32 °C</td>
<td><img src="image9" alt="Flour beetle" /> <img src="image10" alt="Flour beetle" /></td>
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<td>Manual – Mechanized</td>
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THANK YOU FOR YOUR ATTENTION

Silos Córdoba Business Group

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Silos in Egypt: parameters to consider

Seismic zone
Silos in Egypt: parameters to consider

Weather:

https://weatherspark.com/y/96939/Average-Weather-in-Cairo-Egypt-Year-Round