Strategies for good flat glass storage

While considerable attention has been given to developments in the glass industry over the last twenty years in terms of glass types and glass machinery, the importance of storage has perhaps been underestimated. In this article, the author assesses the various aspects of glass storage which should be taken into consideration when companies decide to update or expand their storage facilities.

The changes which have occurred in glass storage are chiefly the result of the increasing variety of characteristics which glass companies must offer their customers. Long gone are the days of a range of plain 3-4 mm glass sheets. Thanks to research in glassmaking, there is now a vast variety of glass colours, sheet sizes and technical features. Glassmakers today have to manage both greater amounts and greater varieties of glass stock.

Economic factors have also contributed to increasing stocks. In order to ensure competitive prices, 2.5-tonne deliveries are now the usual practice, with eight different types of glass loaded on the truck.

The overall increase in stock levels has had a number of repercussions. Increased distances of storage facilities from production areas means that staff spend more time moving around the factory. This means increased costs, greater risk of injury, and a waste of time.

Economic considerations

The price of yardage of industrial premises, which will continue to rise despite the present slowdown, and the effect of an increase of
surfaces used on industrial taxes, encourage stock rationalization aimed at limiting the area needed for storage. The solution of transferring to a new site in order to solve problems of space may not always be well received by customers.

Storage of several piles of different types of glass on the same stand brings about a wastage of time and increased costs which, in the current period of strong competition, can mean lower profit levels. Deliveries need to be rationalized, with bulk delivery for all sizes of glass. A system of returnable crates needs staff and also immobilizes funds which could be put to better use. Moreover, the cost of unreturned crates is unacceptable when the price of glass itself is low. Closed crates should only be used for shipping over long distances. For land transport, the increased costs of wood and labour are clearly not economical.

Rational storage allows the quick unloading which suppliers, forced by the present economic situation to increase productivity, will insist on.

**Worker safety**

The risk of injury and even loss of life makes safe storage a priority. The collapse of a stand which then pulls down others with it may not only constitute an economic disaster. It may also, and above all, be the cause of serious or even fatal injury to staff.

Stands may be placed dangerously close to each other because of a lack of space. This makes it difficult for workers to move about the plant and often makes picking up glass sheets a job for acrobats. This is not only dangerous but also detrimental to plant productivity.

Packaging which comes with deliveries clutters the surroundings. European legislation concerning responsibility for packaging until its destruction places suppliers in a difficult position, without removing the responsibility of plant managers in the case of accidents caused by heaps of frames rotting away in a corner of the company premises.

Safety levels decrease in proportion to the distance between the storage area and the workshop. Every time glass is moved over a certain distance using tongs or suction grips, the risk of accidents involving members of staff or visitors increases dangerously. Certain companies, where accidents have happened or where the management is safety conscious, are organized so that nobody can move about between storage and cutting tables. As the movement of glass constitutes a safety hazard, measures should be taken to minimize the need for movement.

In areas where there is the risk of earthquakes, every evening wooden wedges have to be nailed on so that stands do not fall over if there is a quake. This is the best demonstration of the safety problems of the present system.

All of the above-mentioned factors also clearly have a negative economic effect. It follows, then, that improving plant safety helps improve profitability.
Choosing a storage system

Nowadays, most companies have not actually chosen a storage system but have adapted existing systems to new necessities and have accepted systems of delivery used by their suppliers. A storage system should, however, be chosen like any other piece of glass-working machinery, taking a certain number of elements into consideration. The decision to store on a certain type of rack should be motivated and not forced.

a) Dimensions

One of the most important elements of choice is glass sheet size, essentially PLF and DLF. PLF, usually known as “Jumbo”, is used by companies working on a large scale and with suitable delivery facilities. Standard dimensions are 6 x 3.21 metres. The usual dimensions of DLF are 3.21 x 2.40 metres, although other sizes, such as 3.21 x 2.55 metres, 4.40 x 2 metres and 2 x 1.60 metres are also to be found. A storage system must be able to adapt to all these differences.

b) Stock rotation

The increased number of glass sheet specifications has considerably slowed down average stock rotation times. In the case of glass types with rapid rotation, simple solid systems allow for rational storage. However, more careful consideration and a different approach are necessary when the variety of glass types means medium or slow rotation. Glass types with particular characteristics are the most profitable but also take up the most space if care is not taken. It is often with such glass that several types are stored in the same place, which means spending time unpiling sheets before the type needed can be reached.

c) Weight

The rapid rotation types of glass, which are bulk stored in several packs of 2.5 tonnes, are easily handled by professionals. Storage of one or two packs of 2.5 tonnes and sheets delivered in even smaller quantities need careful thought.

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**GLASS STORAGE SYSTEMS**

<table>
<thead>
<tr>
<th>System</th>
<th>Advantages</th>
<th>Disadvantages</th>
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<tbody>
<tr>
<td>Stand/easel</td>
<td>- easy to set up</td>
<td>- risk of toppling</td>
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<tr>
<td></td>
<td></td>
<td>- unstable when unloaded on one side</td>
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<td></td>
<td></td>
<td>- takes up space</td>
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<tr>
<td>Rails</td>
<td>- suitable for heavy pieces</td>
<td>- not suitable for multiple specifications</td>
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<tr>
<td></td>
<td>- low cost to weight stored ratio</td>
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<tr>
<td>Drawers</td>
<td>- suitable for multiple specifications</td>
<td>- difficult to handle over 1.5 t</td>
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<tr>
<td></td>
<td>- saves space</td>
<td>- only suitable for small dimensions</td>
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<td></td>
<td>- clean storage</td>
<td></td>
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<tr>
<td>Orthogonal</td>
<td>- saves considerable space</td>
<td>- high instalment costs</td>
</tr>
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<td></td>
<td>- system safety</td>
<td></td>
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<tr>
<td></td>
<td>- keeps stock close to workshop</td>
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</tr>
<tr>
<td></td>
<td>- suitable for all weights and sizes</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- ease of loading and unloading</td>
<td></td>
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<tr>
<td></td>
<td>- all glass specifications accessible</td>
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<tr>
<td></td>
<td>- improves company image</td>
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<tr>
<td></td>
<td>- allows loose delivery</td>
<td></td>
</tr>
<tr>
<td>Crates</td>
<td>- easy to handle</td>
<td>- increasingly expensive</td>
</tr>
<tr>
<td></td>
<td>- low risk of breakage</td>
<td>- not adaptable to range of specifications</td>
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**Fig. 2**

Ortan drawer storage
Drawers, for example, which do save space, are difficult to manipulate, making this kind of investment inappropriate in most cases.

d) Types of delivery
Depending on whether deliveries come loose, boxed, in returnable or non-returnable crates, your storage system will differ. Jumbos are delivered loose and everybody has adapted to this, often losing considerable space. For DLF, however, there are many size possibilities. This situation will evolve and storage facilities must adapt. Most suppliers are moving towards loose delivery, meaning that they are not then responsible for the disposal of packaging, they do not have to run a system of returnable crates and there is no longer any wastage of unreturned crates.

e) Loading equipment
Whether you have a hoist or not, loading and unloading gear for heavy weights is absolutely necessary when stock arrives and has to be manoeuvred. Considerable sources of productivity can be found in this sector by improving and diversifying equipment.

f) Glass prices
Often, with glass as with other products, the quantities ordered have a marked effect on the price. Costs can be lowered without having to increase surface area if glass of different specifications can be received in 2.5-tonne packs. Strong competition means that practical solutions must be found and a company’s storage system must contribute to help optimize purchase costs. In the long run, companies which cannot take loose delivery of glass on a small surface will be penalized in comparison with those which can.

g) Space saving
Trying to save space is a regular pastime in most industries. It is even more important where glass is concerned, in view of the multiplicity of technical qualities on the market and the rapid increase in the range of colours, since glass once again became an important element of decoration.
A chronic lack of space has a negative influence on the quality of storage, staff safety, productivity and the rationalization of purchases. Solving space problems by enlarging the plant is one solution, although it is not always the best and has an effect on certain taxes. Such an enlargement is only justified if the company is expanding.

Space wise, the scale of differences is from one to four depending on the type of storage. Orthogonal storage is by far the best for large quantities.

h) Stock accessibility
Systems holding different sheet specifications, whereby unpiling is necessary to reach the desired glass, are to be avoided. The time wasted and breakages which happen while glass is being moved cost much more than the purchase of a suitable storage system.

i) Effects on productivity
Certain storage systems are expensive to run, because not every type of glass is immediately accessible. Productivity is also lost, however,
**SINGLE STATION MACHINES**

The French firm SFDD (Société Française de Développement et de Distribution) produces a range of glass storage systems for different types of user.

**STORM** - orthogonal storage system: a highly stable system with large capacity but a small footprint with which, according to SFDD, firms can gain up to four times more space for storage of both DFL and PFL. It makes it possible to work closer to stock and therefore faster. Sheets can be found quickly and safely, and the whole system is modular, enabling clients to specify the number of storage sections as well as the base thicknesses required. Sections can be moved either manually using a handle, or by electric motor, with a safety system for the handling of large sheets.

**ORTAN** - drawer storage system: a lightweight, compact system designed to take loads of DLF up to 3 tonnes, ideal for off-cuts and small sheets, or glass with low stock rotation. For PLF, the Ortan system is available for 3 or 6 tonnes with a new easy system to pull out the drawers. SFDD claims the Ortan is the only drawer system accessible from both sides.

**CARROUSEL** - high-capacity storage system: a system designed for high-consumption and industrial manufacturers. Carrousel can supply several production lines automatically, with each section capable of holding up to 50 tonnes of glass.

_when the glass is stored at a certain distance from the workshop, Time is wasted as workers move glass from one area of the plant to another. Moving glass means fetching it, chatting with fellow workers on the way, and it may also mean a stoppage in the fabrication process. Certain specifications of glass can cause a loss of over 30 per cent in productivity._

\[ j\text{) Increased safety}\]

Rational storage must ensure the safety of those working on the company premises and those visiting.

Racks are often too close together, badly fixed or not fixed at all, of different quality and size, with no information concerning authorized weights, and not in conformity with European standards. Problems or accidents caused by poor storage will be more and more detrimental to companies and it is advisable to work out a storage system which conforms to the relative norms calmly, rather than being forced to spend money hastily as a result of a problem or the visit of an inspector.

Safety is a necessity and a duty. When machines are brought up to conformity, storage systems must be included.

\[ k\text{) Company image}\]

Nowadays, the processing of glass needs considerable investments and highly sophisticated machines. Many companies show their principal clients around their plants, so that they may see for themselves that quality will be maintained thanks to the machinery installed. It is equally important to show production to bankers and suppliers. In this context, a storage system which is rational, easy to understand, ensuring safety and productivity, is a good means of developing confidence on the part of clients and partners.