

# Material Stacking Safety Policy



Unsafe stacking of material is a leading cause of workplace incidents and injuries, as well as OHS citations. That's why it's important to create and implement a safe stacking policy at your workplace. Here's a template policy that you can adapt.

## 1. PURPOSE

The purpose of this Policy is to establish and implement general safety guidelines and practices ensure that material stored at ABC Company workplaces are stacked in a way that is safe and compliant with the [province] *Occupational Health and Safety Act* ('Act'), Occupational Health and Safety regulations ('Regulations'), as well as the ABC Company Occupational Health and Safety Program ('OHS Program'), Material Policy and other applicable requirements and standards.

## 2. FLOORS & SUPPORTING SURFACES

### 2.1 Safe Loading Capacity

The OHS Manager will designate competent personnel to determine and, if necessary, conspicuously post the safe load for floors where materials are stacked and ensure that those loads are not exceeded. In determining safe load capacity, competent personnel must make due allowance for extra weight due to stored material's becoming waterlogged or other causes. The supporting surface must also be sufficiently strong to withstand the effects of any damage to or deterioration of stored materials.

### 2.2 Level Surface

As a general rule, material must be stored on a level floor or surface and, if necessary, supported by timber, concrete or other surfacing.

### **3. RACKS & STORAGE STRUCTURES**

Racks, shelving, bins, hoppers and other structures used for storage of materials must be adequately designed to support and contain the materials for which they are used. Allowance must be made for the possibility of stored materials becoming waterlogged, and for shock loads from placing materials or from accidental contact by handling equipment. Partitions used to increase storage capacity or separate stored materials must be adequately designed and of sufficient strength to contain the stored material safely. Fire-protective partitions must be used between stored items of differing vulnerability to fire. The corners or ends of shelving and racks must be protected from damage by forklift trucks or mechanized equipment by steel posts, angle irons or other means. Storage racks and shelves should be noncombustible and not prone to retain water.

### **4. PALLET CONSTRUCTION & LOADING**

Pallets must be of sound construction and have adequate strength for the loads and conditions under which they are used. Where pallet loads are stacked tier on tier, the lower pallets must be of suitable strength and in good condition and the unit loads must be able to support the weight above. The stability of stacked pallets or unit loads must be maintained to ensure that the contents of any pallet or unit load cannot collapse via the use of bonding, avoiding excessive stack heights and other suitable methods. Bonding, taping, shrink wrapping or other methods must be used to ensure the stability and structural strength of each pallet or unit load. When pallet or unit loads of cartons or sacks are stacked, care must be taken to ensure that they are not damaged by equipment. Pallets or other supports used for forming unit loads must be regularly inspected for damage and wear. Items which could cause damage to materials must be either destroyed or taken out of use until they're properly repaired.

### **5. POSITIONING OF STACKS**

Stacks must not be built within 450 mm of a wall. Most building and party walls are not retaining walls and may not be able to withstand the pressure set up by stacks laid against them. A 450 mm gap must be maintained between the stack and the wall to enable inspection and checking the stack's construction and condition. Stacks must not be located where any part of the stack will be within 1.5 m of a rail track. This clearance must be maintained all the way along the

stack. Extra care must be taken if the storage area is subject to vibration from rail or road traffic, outside or inside the premises.

Stacks, shelving and other fixtures for holding or storing materials must be laid out and designed so that there is sufficient access for safe loading and unloading by either manual or mechanical means. Storage areas must be specifically designated, clearly marked and in the charge of a responsible worker. Aisles must be clearly marked, of ample width for the type of storage and be kept free from obstacles and waste materials. Stacks may not be located in places that will block gangways, aisles, walkways, thoroughfares, doors and exits.

Stacks must have clear spaces of at least 1 m on all sides, apart from walls, where a 450 mm space must be allowed. Goods must not be stacked within 1 m of the ceiling, roof or sprinkler heads.

Base areas and heights of stacks must be kept as small as circumstances permit. Goods must be kept well clear of light fittings, heating pipes and appliances, firefighting and alarm equipment and doors.

No stack, shelving, fixture or other means of storage must be placed in a position, or extended in height, so that a person climbing on to it or removing stored goods, either manually or mechanically, can come into contact with live electrical wiring or unfenced machinery.

No material may be loaded or unloaded from stacks, shelving or fixtures if there is a risk of workers' directly or indirectly contacting unfenced machinery, or touching live electrical wiring, until that machinery or wiring is isolated or made safe.

Where unpalletized material, which is otherwise secure, is handled by a crane or forklift truck, it must be placed on battens or other devices to aid the use of slings or forks.

Suitable means must be used to protect workers from injury due to sharp corners, projections or edges on structures and/or stored material. Corners of stored material must be clearly marked.

Safe access, by means of ladders, platforms or walkways, must be provided for workers required to climb or remove goods from stacks, shelves and fixtures.

Markings on labels and signs for the identification and selection of materials and goods must be clear and easy to read.

## **6. SIZE & SHAPE OF STACKS**

The size and shape of a stack depends on the storage space available and on the size, shape, bulk, weight, rigidity or fragility of the articles to be stored. Common forms of stack include:

- **Column stacks** where single articles placed one above the other;
- **Square stacks** or any stack, other than a column, with all sides vertical

(Note: the stack does not have to be 'square' in the ordinary sense of the word);

- **Pyramid stacks** in which the plan area is reduced in every succeeding tier;
- **Stepped stacks** that have two or more adjacent tiers of the same area and each succeeding group of tiers is of a smaller area than the group on which it is set;
- **Triangular stacks** in pyramid or stepped form on two opposite sides, the other two sides being vertical;
- **Lean-to stacks** which are pyramid or stepped on one side and vertical on the other three sides.

In all cases, the aggregate weight of the stack is borne by the lowest tier, which must be strong enough to bear the superimposed load. If a stack appears to be unstable, it should be immediately broken down and properly rebuilt.

## **7. STABILITY OF STACKS**

### **7.1 Stable Construction**

Stable construction of the stack depends on the following factors:

- Safe relation of height to dimension of base;
- Sound interlocking of the goods;
- Contents of the sacks or cartons;
- Compact construction and preventing transfer stress in any dunnage used for artificial bonding;
- Shape of articles;
- Determination of the aggregate weight to be borne by the components in the lowest tier of the stack;
- Proper placing of every component forming part of the stack, with special care taken to avoid overhang on any side or end of a stack intended to be vertical.

### **7.2 Bonding of Stacks**

Resistance to collapse, strength and the stability of stacks must be maintained by bonding, stepping, tying or other suitable means. The ratio of height to base dimensions of large stacks must be correctly proportioned so that failure of part or whole of the stack does not occur. In general, the height to base ratio of an unsupported stack should not exceed 3:1. However, where there is a good frictional grip between the contacting surfaces, the ratio of height to base may be safely increased to 4:1.

### **7.3 Other Factors Affecting Stack Stability**

The shape of goods or packages to be stacked has a bearing on the type of bonding that should be used. Use of natural bonding, i.e. to secure stability by interlocking the articles themselves, when one dimension is appreciably greater than the other two. In other circumstances it may be necessary to use artificial bonding, i.e., use canvas sheets, battens, piling sticks or other materials to prevent movement of the articles stacked.

In assessing the stability of stacks located outdoors, consideration must be given to effects of rain, wind, frost, sun and other weather conditions. Materials that could be dislodged or blown off the top of a stack under windy conditions must be tied down or otherwise restrained. Tarpaulins used to secure or protect stacks must be fastened to independent anchorage, not to the stack itself.

## **8. MATERIAL-SPECIFIC STACKING RULES**

The material being stacked affects and must be taken into consideration when ensuring safe stacking.

### **8.1 Lumber**

The height of lumber stacks should generally not exceed 4.8 metres if the lumber is stacked manually or 6.1 metres if it's stacked by forklift. Screws and nails should also be removed.

### **8.2 Bagged Goods**

Bagged goods should be stored in interlocking rows with all tiers arranged so that the bags can be spread flat. If possible, the mouths of the bags should be on the inside of the stack. Bagged material of differing sizes and shapes should not be stacked on top of each other unless proper precautions are taken to prevent movement by settling or vibration. Pallets with spacers or some form of horizontal bonding should be used if there is a risk of such movement or if it is intended or necessary to stack high. Special precautions should be taken with synthetic bags or sacks, which have a tendency to slip when new.

### **8.3 Bales**

Bales of rags or baled paper should be stored inside, not outside leaving no less than 46 cm between bales and walls or other facility structures such as support columns. Adequate space (46 cm) must also be left between the top of a bale stack and sprinkler heads.

### **8.4 Cartons**

Interlocking should be used to stack cartons. Careful consideration must be given to the weight of stacks of cartons with the understanding that dampness will reduce the strength of cartons and may lead to damage of the lowest tier and cause the stack to collapse.

### **8.5 Boxes**

Because most boxes are reinforced with external battens, care must be taken to ensure that the battens rather than the boxes bear the weight.

Boxes should be banded, cross-tied with plastic fiber ties or stretch-wrapped to ensure stacks of them remain stable. Boxes of like weight and size should be stacked together whenever possible. Because most boxes are reinforced with external battens, care must be taken to ensure that the battens bear the weight, not the box.

### **8.6 Frozen Carcasses**

Because of their shape, carcasses lend themselves to a form of interlocking and this method should be used if possible, together with pallets with spacers or some form of horizontal bonding. A suitable type of mesh netting may be used to retain carcasses on pallets if necessary, provided it meets hygiene requirements.

### **8.7 Coiled Wire**

Coiled wire may be stacked horizontally or vertically. Wedges or other supports must be used to prevent the stack from spreading.

### **8.8 Barrels & Drums**

If possible, use racks to stack these items because they allow higher storage density. If barrels must be stacked, they must be stacked systematically with the bottoms blocked to prevent rolling. Plywood, planks or pallets must be used between each stacked tier to create a firm and flat surface for the next layer when stacking these items on ends. The bottom layer must be chocked to help prevent shifting.

### **8.9 Glass Bottles & Jars**

Small quantities may be laid on their sides on top of each other, using wedges as necessary. Otherwise, glass bottles and jars, whether full or empty, should be stacked in cases, boxes, cartons or racks designed to hold them. If pallets are used, spacers or some form of horizontal bonding must be incorporated. The overall weight of stacks should not be borne by the glass itself.

### **8.10 Sheet Materials**

Sheet materials, including glass, may be stacked flat or on edge. Sharp edges must be protected to prevent injury to workers and passers-by. The supports used in edge-on stacking must be of adequate strength to bear the side thrust of the vertical sheets. Extra care must be taken when stacking and handling glass. With consideration to the weight of metal and glass sheet in bulk, care must be taken not to overload racks and floors.

### **8.11 Steel Tubes Bars & Joist Sections**

Suitable racks must be provided for steel tubes, bars, joist sections and similar materials. Large-diameter tubes or pipes can be stacked on their sides, as for drums. Wedges, chocks, stakes or other means must be used to restrain the bottom tier of round objects which are stacked or tiered and which could cause the stack to collapse by rolling or moving. Where successive tiers are not nested but rest on battens, planks or other flat surfaces, they must be restrained from moving by wedges secured to the battens or planks. Where the

collapse of a stack or tiers of round objects could cause damage or injury, material to be removed must be taken from the top of the stack or from the top tier first.

## **9. SEGREGATION OF STACKS**

Flammable liquids, gas cylinders, aerosols, materials liable to spontaneous combustion and hazardous chemicals may not be stored in the same area as other goods. Chemicals that may react with each other or other materials must not be stored together unless adequately protected from contacting each other, either directly or by spillage.

Acids must not be stored in plastic containers for long periods or in direct sunlight.

Flammable liquids in drums, cans or similar containers must be stored separately in a separate area or building constructed for the purpose. Toxic or poisonous chemicals or substances must be stored separately in a separate area or building constructed for the purpose. The storage area or building must have clear signs to indicate that it contains flammable or hazardous chemical materials and that smoking and naked flames are prohibited. Electrical equipment used in or around the storage area or building must be suitably explosion-protected, and protective equipment must be provided nearby for use in emergencies.

Workers handling corrosive or hazardous chemicals must be provided with and use suitable protective clothing, or other necessary safeguards.

Liquefied and compressed gas cylinders must be stored in well ventilated areas, out of direct sunlight and away from possible sources of ignition, especially electrical fittings or fuse boxes.

The contents of all containers, drums and cans must be clearly labelled.

## **10. UNSTACKING**



The following safety rules must be followed when breaking down stacks:

- One person and only one person should be responsible for the methods used to reduce the stack;
- The person in charge of unstacking must be aware of how the stack is constructed before unstacking begins;
- Stacks must be taken down tier by tier so that no part is ever in danger;
- If a large stack has been given a natural fence by building the periphery higher than the centre, the fence must be maintained during unstacking;
- Unstacking should be done outward from the centre, reducing the periphery last so that there is a barricade to prevent people falling off;
- If tubular or other fencing has been built in or around the stack, it should be dismantled and adjusted as the height is decreased;
- People working on stacks must be clear of overhead travelling cranes at all times;
- Proper signalling arrangements must be made and a lookout must be posted;
- A competent supervisor must oversee the unstacking process.