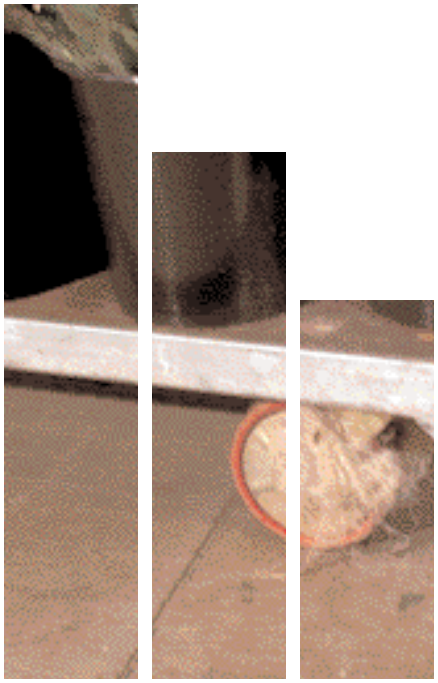
WORKING ENVIRONMENT CONDITIONS

FLOWER CONTAINERS IN MARKET GARDENS

The Danish Industry Working Environment Council
(Branchearbejdsmiljørådet)

Farm to Fork



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>> PREFACE

The Danish Industry Working Environment Council, Farm to Fork (Branchearbejdsmiljørådet ("BAR") Jord til Bord) is made up of representatives of management and labour and has been set up under the Danish Health and Safety at Work Act. One of the Council's tasks is to provide information and guidance about working environment conditions in agriculture.

This industry guide concerning "Flower containers in market gardens" has been prepared by the Danish Agricultural Environment Board (Jordbrugets Arbejdsmiljøudvalg) based on Occupational Health Service Funen's (BST Fyn) assessments of strains on the motor apparatus caused by the use of CC containers in flower market gardens.

The Danish Working Environment Authority (Arbejdstilsynet) has reviewed the guide and finds that its contents comply with the Danish Health and Safety at Work Act. The Danish Working Environment Authority merely assessed the guide in its present form and has not considered whether or not it covers all relevant issues within the area in question.

The guide is based on the knowledge available about physical strains and includes recommendations to minimise such strains.
February 2004

The Danish Agricultural Working Environment Board (Jordbrugets Arbejdsmiljøudvalg)

Johnny Ulff Larsen
Chairman

Karl Mikkelsen
Deputy chairman

>> INTRODUCTION

This industry guide concerns handling, loading and internal transportation of containers in flower market gardens.

The guide is a contribution to the companies' work to promote safety and health, mainly by preventing ergonomically straining work from heavy lifting, bad working postures, pulling and pushing.

The guide includes various useful instructions of how companies may handle flower containers in a safe and healthy way. The guide may also be used as an aid in connection with the preparation and revision of the companies' workplace assessments.

>> 1.0. WORKPLACE ASSESSMENT

The objective of preparing a written workplace assessment (arbejdspladsvurdering - "APV") is to ensure that the companies work systematically and continuously with their safety and health initiatives.

Therefore, an APV must include a mapping of the company's working environment conditions and provide an overview of how and when the jobs prioritised will have been carried out. Employers are obliged to ensure that a written APV is prepared in cooperation with the employees. The safety organisation must participate in the planning and implementation of the APV. Such cooperation must be documented by having the safety organisation endorse the APV.

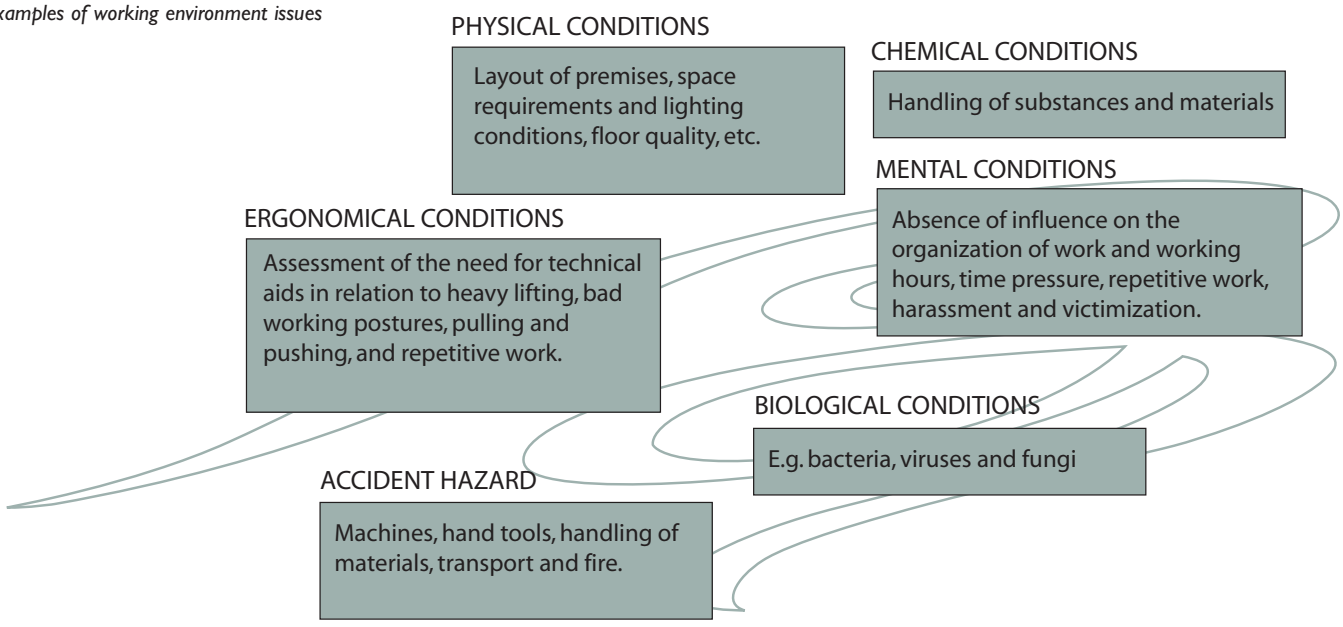
Systematic review of the workplace
The entire company must be reviewed, including buildings, work processes and workplace layout. The company is free to choose which method is to be used for the implementation of an APV. For example, it may start by asking its employees the following questions:
- How can job satisfaction be improved?
- How can unnecessary irritation be prevented at work?
Another starting point of the APV is to register absence due to illness and work-related injuries as well as to prepare checklists and questionnaires.

The APV must be implemented at least every three years or in connection with changes influencing safety and health at work.

Description and solution to problems
The safety organisation reviews the company and together with the employees prioritises which working environment issues to consider first.

Follow-up
The workplace must be assessed continuously and always in connection with changes in work, working methods, etc. The initiatives/action plans implemented must be followed up, for example as a fixed item at safety committee meetings.

Examples of working environment issues



>> 2.0. ASSESSMENT OF ERGONOMIC INFLUENCES

2.1. Lift assessment

Three different ranges are used:

- Lifts close to the body
- Lifts at a forearm's length
- Lifts at 3/4 arm's length

The chart below can be used to assess the health hazards of single lifts:

The risk of health hazards to the back under the following conditions:

- lifting large weights
- lifting combined with twisting of the body
- lifting below the knees or above the elbow
- repetitive work

Straining working postures, a high rate of work or a large, total lifting amount every day may cause hazardous strains, even at low weights.

Single lifts of container bases involve lifts in ranges between 30-45cm. Combined with a weight of 25-30 kg, this means that the lift is assessed as a risky lift. Low and high lifts of shelves in connection with the assembly of containers are considered hazardous when the lifting positions are combined with the ranges as well as the weight of the shelves.

Assessment of total lifting amount

When a major part of the workday involves lifts, various normative weight indications of the total amount lifted every day may be used. The weight indications may be considered indicative to persons who may carry out the lifts at a proper working height – between mid-thigh and elbow height:

Fig. 1: Assessing lifting under optimum conditions

>> 2.0. ASSESSMENT OF ERGONOMIC INFLUENCES

- 10 tonnes/day for lifts close to the body
- 6 tonnes/day for lifts at underarm's length, 30cm from the body's line of gravitation
- 3 tonnes/day for lifts at 3/4 arm's length, 45cm from the body's line of gravitation

If the lifts cannot be carried out at a proper lifting height and proper working posture or if other exacerbating conditions exist, the total amount to be lifted every day must be reduced.

Any "abnormal conditions" in connection with lifting must be considered in addition to ranges and total amount lifted. In this connection, examples of abnormal conditions are:

- Quick and lopsided lifts
- Bending and twisting the neck and back during lifts
- Lifts above shoulder height
- Lift from and to low heights
- Unstable trays
- Inadequate space
- Cold/draught (cold storage)
- High temperature (greenhouses)

2.2. Assessment of pulling and pushing

Containers are typically transported in three ways:
Walking beside the container, pulling it with one hand in the front column.
Pulling two containers – one in each arm.
Pushing heavier containers with both hands, using the rear columns.

- Various conditions form part of the assessment of strains connected with pulling and pushing
- Weight and stability of the containers
- Wheel design
- Surface condition
- No. of stops and starts
- Transport length
- Working postures and movements
- Grip height
- Visibility
- Space requirements

Strains on backs, shoulders and arms depend on several other factors than the container's weight.

The size, width and maintenance of the wheels influence the container's movements.

The surface condition is very important to the ease with which the container moves. The power needed to transport containers on uneven concrete is much higher than the power needed on an even surface. Bumps, holes, slopes, floor hardness, soil on the transportation route and the length of the transportation route influence the strain. Small level differences between various surfaces increase the effort and noise levels considerably.

Many stops and starts affect the body as starting efforts always exceed efforts once in motion.

Manual pushing of container

>> 3.0. DISTRIBUTION OF FLOWERS

Grip height and visibility decide which working posture to use. Back twists increase the strain. Pulling and pushing with one hand strain both back and arms.

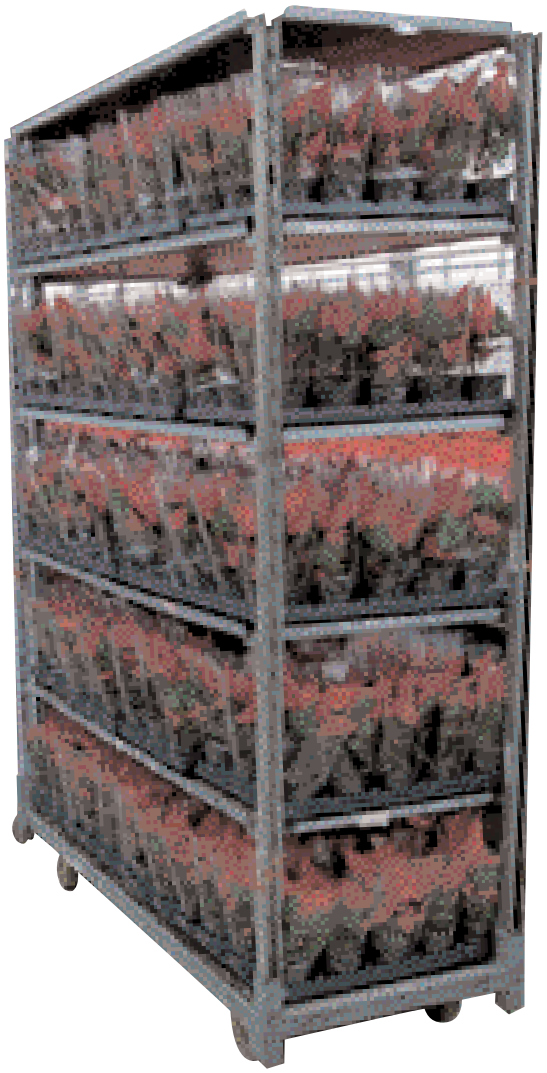
Whether you choose to pull or push the container depends on the location of the swivel wheels, visibility, flower box stability and the amount of effort needed to keep the container moving. Inadequate space and narrow access roads may increase the strain.

Reference regarding assessment of strains: AT guide D.3.1: Lifting, pulling and pushing.

3.0. Flower containers

The major part of plant distribution is carried out using CC containers. The flowers are packed in the market gardens and then carried by lorry to wholesalers, sales organisations or retail outlets. Danish flower market gardens also use CC flower containers for internal transport in their greenhouses and between the greenhouses. Plants ready for sale are transported from the greenhouses to a cold storage or a packaging hall where various plant products are often "mixed" in containers for further transport by carriers. The containers are also used for outdoor transport.

The carriers who pick up the plants leave a similar number of empty containers with the market gardens. The vast majority of return containers are delivered disassembled which means that they have to be assembled using a bottom, four columns and various shelves.



CC container

>> 4.0. REVIEW OF WORK PROCESSES

4.1. Handling empty container equipment

The work of assembling the containers is often carried out at a central location of the market garden. The shelves are delivered stacked separately on a container base. The stacks may typically be 150cm and 180cm high, respectively.

The assembly process consists of lifting a bottom from the stack, assembling four columns and mounting the desired number of shelves in the columns at the distance required. Defective bottoms, columns or shelves must be discarded when assembling the container.

Lifting container bases is definitely the heaviest single lifts and the most risky ones in terms of lifting positions. The work is physically demanding and straining to arms, shoulders and back. Assembling containers also involves a risk of acutely straining the back. This risk increases if the work is carried out at a quick pace and for the entire workday.

Container bases

When assessing container assembly, it is important to distinguish between assembling a few containers as required during a workday and a few employees assembling all containers used in the market garden. This work task should be carried out using technical aids.

> Problem: lifting

Lifting container bases in connection with stacking and destacking involves a risk of straining the joints of the lower back.

Recommendation:

Avoid or limit lifting by using technical aids. If, in exceptional cases, no technical aids are available, container bases should be lifted by two persons.

Recommendation:

A pallet stacker can be used to lift the container bases.

Recommendation:

A pallet stacker can be used. The pallet stacker lifts the topmost container bases to allow the lowest base to be pulled out from the stack. The pallet stacker can also be used to stack the bases.

Recommendation:

A vacuum lifter can be used to lift the topmost container base to the floor. Vacuum lifters are available in designs with articulated, extended controls allowing lifts from a high stack above shoulder height to the floor without having to assume strenuous working postures. Vacuum lifters can be mounted on a wall-hung or column-mounted pivot arm. They may be mounted on a traverse if they

Vacuum lift

Pallet stacker

>> 4.0. REVIEW OF WORK PROCESSES

are to cover a larger working area.

Shelves
Lift shelves from the stack and mount them in the holes of the columns when the four columns have been mounted on the bottom. The number of shelves used for the container may vary with the height of the plants but is typically between two and ten shelves. The shelves are placed from 35-40cm to approx. 190cm above the floor.

> **Problem: lifting**
Lifting from a stack above shoulder height and below knee height.

Recommendation:
You can avoid all lifts above elbow height by, for example, establishing pits in the floor with double scissor lift tables which can be lowered approx. 160cm below floor level. The scissor lift tables can be raised some 40cm above the floor to allow assembly of the bottom shelf in a proper working height. The pits can be placed at an angle of 90° in relation to each other. Place the shelf stack on one scissor lift table which is then lowered to a proper lifting height. Place an empty container bottom with four columns on the other table and lift it to a height allowing assembly of the lower shelf without bending your back. The scissor lift table with the shelf stacker can be fitted with a photoelectric sensor to allow automatic adjustment of the stack to an individually selected working height. The scissor lift table used to assemble the container should be lowerable in adjustable increments using automatic controls corresponding to the desired shelf distance of the container in question. When placing the scissor lift tables, please pay attention not to impair carriage and access roads.

Recommendation:
Mobile scissor lift tables may be used in some instances.

Recommendation:
A container separator separates the shelf stack delivered from the columns and container bottom. The shelves are delivered using a magazine in a proper lifting height for the employee who assemble the container. The plan is to develop the system further in the coming years in order to connect an actual "automatic container assembly device".

> **Problem: defective equipment**
Lifts are aggravated by defective equipment where the shelves are released abruptly. Long-lasting, static lifting/holding may occur when mounting shelves if the shelves and columns do not immediately match.

Recommendation:
Routines should be introduced for handling defective equipment.

Scissor lift table

>> 4.0. REVIEW OF WORK PROCESSES

4.2. Handling filled containers

The containers are fitted with four wheels of which two are swivel castors. The easiest way to handle the containers is at the end with the swivel castors. The strain on the back is less during pushing than during pulling.

The container should always be loaded with as low a centre of gravity as possible. This provides maximum stability and minimum use of effort when starting and driving the container in the market garden. Always load the heavier plants in the container's lower half but never place very heavy plants on the lowest shelves to avoid straining the back by lifting. This also facilitates the work of employees in the packaging hall or sales organisations when reloading plants as the heavier lifts will not be the highest or lowest lifts.

> **Problem: floors**

Extensions of new greenhouses may have created differences in level between the houses of the market garden. Pulling and pushing up and down sloping surfaces may create a high strain on backs, shoulders and arms and should be avoided as far as possible.

Recommendation:

For manual transports between different levels, the gradient must be less than 1:50, corresponding to a gradient of 2cm per meter. The gradient may be 1:20 if the gradient is shorter than the distance between the front and rear sets of wheels. The permitted gradient is 1:10 if the containers are pulled by small electric trucks.

> **Problem: pulling and pushing**

Containers are usually pulled by walking beside the container, pulling with one hand or pulling a container in each hand. A long transportation route to a packaging hall or cold storage will increase the risk of shoulder injuries from this pulling work.

Recommendation:

CC containers may be connected and pulled by a small electric truck thus minimising the strains of pulling and pushing.

Recommendation:

Introduction of conveyors may eliminate pulling and pushing of containers in market gardens. Wide conveyors are suited for the transport of entire boxes or frames. Narrow conveyors are suitable for the transport of single plants in a row on the conveyor. The conveyor type to be used depends on the production.

Recommendation:

When the container is full, pushing is recommended rather than pulling. You must push with both hands on the columns at a level between your stomach and elbows. Push at the swivel castors to avoid twists and lopsided strains on the back.

Recommendation:

Plan the transportation to ensure the minimum amount of obstacles to avoid. Arrange the work to ensure frequent alternation between loading and transport.

Electric truck

>> 4.0. REVIEW OF WORK PROCESSES

> **Problem: space requirements**
Transportation to and from trolleys will often use the same transportation route so that the containers cannot be turned in the corridors between the tables.

Recommendation:
Pull or push empty containers in the corridors with the swivel castors in front so that the filled, heavy container can be pushed out.

Recommendation:
Arrange the work so that one heavy, exhausting task does not continuously follow another. Load and drive one container at a time.

> **Problem: outdoor transport**
CC containers should not be pulled or pushed outdoors unless the surface is firm and even.

Recommendation:
Technical aids in the form of motorised pulling or an assisting vehicle with larger wheels should be used to transport the container.

Recommendation:
You can facilitate the transport by laying out conveyors if the outdoor areas are located next to the market garden. The plants can be run from workstations in the greenhouse to the outdoor areas without being loaded on containers. A large forklift truck handling several plants at a time can be used to unload the containers from the conveyor.

> **Problem: bad wheels**
Narrow wheels and wheels with a small diameter increase the strains of pushing and pulling. Defective or poorly maintained wheels may result in an oblique pulling direction and cause a great strain on arms and legs.

Recommendation:
To ensure containers with excellent manoeuvrability, wheels should be wide and have a diameter of at least 10cm.

Recommendation:
Fixed maintenance routines are recommended. Ensure that the wheels are in good condition and run easily.

Container with wheels entangled in plastic

>> 4.0. REVIEW OF WORK PROCESSES

4.3. Loading containers at trolleys

Place the empty containers in the corridor outside the space between the trolleys. Load the plants on containers and transport them to other greenhouses, to shipment in packaging hall or to a cold storage.

Place the flowers readied for shipment separately or several at a time in the packaging to be used for further transport, e.g. styropor trays or plastic bags and then in plastic/styropor trays with a varied number of holes. Place other plants in trays with plastic cast round the entire tray or in cardboard boxes and load them onto containers.

Reduce unnecessary strains from lifting and handling by using stable, easy-to-handle packaging.

From trolleys to containers

> **Problem: lifting**

Lift trays/boxes from trolleys and carry them to the container, one or two trays/boxes at a time. Lift at various heights, depending on the size of the plants. Prolonged lifting and carrying at shoulder height in a "waiter position" strain shoulders, fingers and wrists.

Recommendation:

If there is room, push or pull several trays in front of each other, either on the bottom of the trolleys or on the bottom and side edge at the same time. This method is assessed as far less straining that lifting trays/boxes. Arrange the work so that the table is emptied from the aisle, away from the container, and so that the table edge is kept free to pull/push trays/boxes.

> **Problem: space requirements**

The space between the tables may vary much; from being able to walk effortlessly facing forward without bumping against the trolley to so little distance between the tables that you have to walk sideways. The latter may cause a strain on the back as you have to carry the load with a twisted back.

Recommendation:

Arrange the work so that you do not have to work at trolleys placed closely together in the same row.

Recommendation:

The tables must be spaced adequately to ensure a natural walk.

Recommendation:

Ensure proper space considering the work functions to be carried out.

>> 4.0. REVIEW OF WORK PROCESSES

Containers in the aisles in greenhouses
Plants to be moved from one greenhouse to another on containers are typically placed on trays which are lifted from tables to containers and back. Unstable plants/trays are often lifted on a thin plywood board placed directly on the shelf in the container. The trays/boards are lifted from the shelves on the containers back to trolleys in other houses for further growth. Trays with plants in flower market gardens weigh up to approx. 8kg but typically, the majority of the trays weighs less than 6kg, often 3-5kg. The plants will often be sorted/finished before further transportation when the containers are loaded.

The aisles in the greenhouses are 115-120cm wide, just allowing two CC containers to pass each other.

> **Problem: packaging**
During packaging, the plants are continuously moved from the trolleys to the containers.
Placing plants above shoulder height and on the bottom shelves below knee height cause straining working postures and require the use of technical aids.

Recommendation:
Use technical aids for lifts below knee height and above shoulder height.

Recommendation:
When packaging several types of plants, it is important to place the heavier plants in the lower half of the container, however, not below knee height, both considering lifts and stable transportation of the container.

> **Problem: lifting**
Back-straining lifting may be required when filling the lowest shelves below knee height and the top shelves above shoulder height.

Recommendation:
Use technical aids for lifts below knee height and above shoulder height.

Recommendation:
The scissor lift table with a container may be lowered into the floor thus avoiding low and high lifts as the loading height can be adjusted in steps as required.

Recommendation:
Use conveyors in the greenhouses. Wide conveyors can transport pots or trays/boxes to the end of the greenhouse where containers may be placed on scissor lift tables.

> **Problem: metal edge on shelf**
The metal edge on the shelves means that the flowers are not pushed easily onto the shelf but have to be put onto the shelf. This is par-

Conveyor in greenhouse

>> 4.0. REVIEW OF WORK PROCESSES

ticularly an issue in connection with high lifts, depending on the design of the bottom of the tray/box.

Recommendation:
Fit a loose aluminium board on the CC shelves, raising the bottom of the shelf and equalling the metal edge of the shelf. This avoids lifts over the metal edge of the shelf. You can push the tray/box onto the shelf.

> **Problem: pulling and pushing**
Manual handling of the containers.

Recommendation:
Please be aware of loading the container symmetrically to achieve a good balance and stability in the container for further transport.

Recommendation:
The plants may be transported on conveyors directly to a packaging hall where the containers are loaded according to the same principle using a scissor lift table in the floor.

Recommendation:
Conveyors are suited for market gardens where internal transportation causes problems due to differences in level between the greenhouses.

Recommendation:
Technical aids to limit strains caused by pulling and pushing may be small electric trolleys for internal transport or the use of a floor conveyer, pulling the containers.

4.4. Loading containers in packaging hall

When manually packaging/loading in a packaging hall, you take the plants from various containers and collect them in a new container for direct shipment, if possible after "mixing" plants of various colours in each tray. The mixing and loading work may involve much static carrying work in connection with walking work and many lifts.

> **Problem: carrying and lifting**
Shoulder and arm strains when carrying trays in the "waiter position" during mixing and work height when lifting above shoulder height and below knee height.

Recommendation:
The work is carried out at a roller conveyor table where the sales container is placed on a scissor lift table in a pit in the floor. An inclined roller conveyor ensures that the employees will be able to find a proper working height.

Recommendation:
A scissor lift table can be integrated in a pit in the floor so that the container to be loaded can be placed at a proper height.

Roller conveyor table

Automated packaging function

>> 4.0. REVIEW OF WORK PROCESSES

Recommendation:
When loading in a packaging hall, a loading platform can be used where the plants are reloaded to the top shelves.

Recommendation:
An automated packaging function which is easiest to carry out with many plants of the same culture.

Recommendation:
Continuous packaging work should be arranged so that it takes up only a minor part of the workday, e.g. by reshuffling to other work functions which strain the body in a different way.

4.5. Loading containers in a cold storage

CC containers in cold storage are usually handled by pulling/pushing them from the cold storage to a packaging hall for "mixing" on shipment containers or by packaging transport and sales containers in a cold storage.

> **Problem: space requirements**
The containers are placed closely together in cold storage. When one container is pulled from the row, it will be pressed against one of the other containers. The containers will then be wedged together and it will require forceful pulling/jerking to free them. This will put a particular strain on shoulders, necks and backs, which poses a risk of a sudden injury as the work is being carried out in cold surroundings.

Recommendation:
When placing containers in a cold storage, it is important to ensure sufficient free space on both sides of the container to prevent it from lodging when another employee has to pull it from the row at a later time.

Problem: lifting
Lifting has to be carried out below knee height and high above shoulder and head height between the "cooling container" and the transport/sales container.

Recommendation:
Use technical aids.

Recommendation:
In connection with high lifts, a step ladder with wide steps and rails can be used to handle light/stable loads on occasion in order to avoid the lifts that strain shoulders and back the most.

Recommendation:
Containers which are driven to cold storage and are known not to require repackaging should not be reloaded below knee height and above shoulder height.

Automated packaging function

Automated packaging function

>> 4.0. REVIEW OF WORK PROCESSES

Recommendation:
Since work including lifting and pulling/ pushing in cold storage is carried out continuously, breaks have to be introduced during work. It is recommended to organise the work to ensure that packaging in cold storage is only carried out in short periods, for example 1-2 hours a day.

> **Problem: temperature**
Work in cold storage means that the entire body or part of the body will be cooled down. As this cooling is caused by cooler fans, the air speed will also be increased (draught). Unprotected areas such as the neck and shoulder region and hands are exposed. This cooling down involves a risk of sudden overloading of muscles and joints.

Recommendation:
Gloves and suitable work clothes must be available at the cold storage.
See section 5.5 regarding work clothes.

>> 5.0. GENERAL PROVISIONS

5.1. Gloves and safety footwear

Safety footwear must be used when handling and lifting container bottoms with sharp metal edges, etc.

A risk of crushing and a risk of hand and foot injury exist when pulling and pushing heavy containers. The use of gloves and safety footwear is recommended.

5.2. Visibility

Light fittings must be located to ensure the necessary amount of light and illumination is available to carry out the work without being disturbed by shadows, reflection or glare. Consequently, fittings must be located below beams and the like to give optimum illumination. In work rooms, illumination should be 300-500 lux and 200 lux in corridors. Light fittings must be kept clean to ensure optimum lighting.

Excellent space and visibility, if necessary by mounting mirrors, and excellent traffic conditions, etc. may help minimise the risk of unexpected strains, unnecessary stoppages, etc.

5.3. Standing and walking work

Standing work may cause swollen legs and swollen, warm feet due to lack of muscle activity.
Preventing strains from standing/walking work should be done by:

- limiting the amount of standing work
- using fixed shoes with soft soles
- using soft mats/coatings
- alternating walking, standing and sitting down.

If it is possible to carry out the work sitting down without drawbacks, the workstation must be designed for this. If the work has to be carried out standing or walking, proper seating must be available as far as possible for use during breaks in the work.

For standing work, work footwear is recommended with excellent absorbing soles or the use of shock-absorbing mats at the workstations. Good footwear and mats help maintain warm feet which is why mats are highly suitable for cold rooms.

5.4. Cold and draught

Cold and draught are exacerbating conditions in connection with physically straining work. The risk of accidents and injuries to ligaments and muscles increases as the body is cooled down.

General provisions have to be made regarding cold and draught in work where there are no technical reasons for temperatures outside the comfort range. The precautions include heating, etc. The comfort range is the temperature range where you perceive the temperature as neither too cold

>> 5.0. GENERAL PROVISIONS

nor too hot by means of ordinary use of clothing.

Reference to AT notice 1.01.7 regarding temperatures in work rooms at permanent workplaces.
Reference to AT guide A.1.3 – Work in high and low temperatures.

5.5. Work clothes

Provisions have to be made in the form of special work clothes and, if necessary, reduced working hours in cold rooms if temperatures in the comfort range are not possible for technical reasons.

Work clothes to protect against the cold because temperatures in the comfort range are not possible for reasons of production technology are personal protective equipment.

Principles of clothing protecting against the cold:
The clothes must insulate against the cold, be breathable, venting and a comfortable fit.
They may be breathable (if possible, insulating) underwear, intermediate layers and outer clothes.
Suitable footwear, socks and gloves are also important to protect against the cold.

5.6. Bullying and harassment

Bullying and harassment influence job satisfaction and well-being, for example as the result of a bad tone among employees and/or exclusion of colleagues. The company is recommended to establish competence in the area by having shop stewards and management representatives take relevant courses. It is also recommended that the company prepare a staff policy for the area.

5.7. Pregnant women

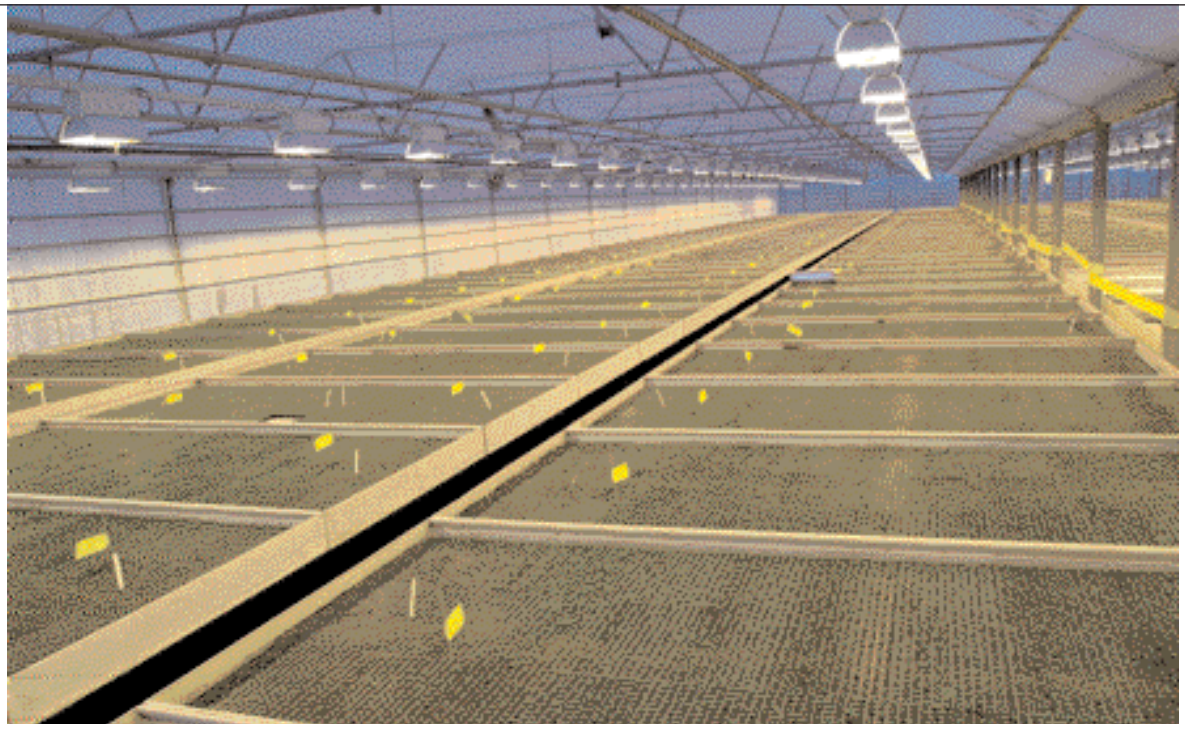
Pregnant women should avoid lifting heavy burdens. After the 12th week of pregnancy, pregnant women should lift as little as possible in each lift. They should avoid lifting loads of more than 10-12kg. This risk is also increased if optimum lifting conditions are not provided. If loads of approx. 10-12kg are lifted, each lift should be separated by a certain interval. The total daily lifted amount should not exceed 1000 kg in any one workday.

From the 7th month, the loads of 10-12kg mentioned should be halved owing to the increased distance to the load.

For additional instructions regarding pregnant women's work, see industry guide regarding "Pregnant women's working environment in market gardens", prepared by BAR Farm to Fork.

5.8. Noise

Noise from containers transported on uneven, bumpy concrete floors with level differences is an



>> 5.0. GENERAL PROVISIONS

unnecessary strain.

5.9. Sorting equipment

In connection with the disassembly and assembly of containers, work is made difficult by defective CC equipment or obsolete equipment which does not match CC equipment. This causes unnecessary strains when working in poor, fixed working postures.

At the same time, much more force is required to free or assemble the equipment.

If posts are "knocked" into the corner guides of the container base, it is not only the container assembler who has problems. The container assembler transfers a working environment problem to the person who is to disassemble the container. It is also important to check that the wheels roll and swivel effortlessly so that colleagues in the market garden are not exposed to a container which is difficult to manoeuvre due to a warped wheel or a wheel entangled in plastic.

The introduction of fixed routines is recommended in order to sort defective equipment for repairs or replacement from Container Centralen.

5.10. Other ideas

If the container assembler lacks experience, an "arrow" next to the container being assembled may be an advantage. Indicate the number of holes on the assemble column or the height on the arrow. This makes it easier to see where the shelf is to be located and the container assembler does not have to hold the shelf while counting the holes in the column where the shelf is to be placed.

Alternatively, the hole number/distance could be embossed in, for example, every fifth hole in the CC column.

5.11. Work organisation

As many work functions in market gardens are widely characterised by repetitive work, it is important that market gardens pay close attention to organising the work so that more dynamic work functions are not exclusively replaced by "easier" but more repetitive work functions.

Work must be organised to minimise straining repetitive work as much as possible. See AT guide D.3.2: Repetitive straining work and repetitive work, 2002.

5.12. Cleaning containers during assembly

When assembling containers, the equipment is cleaned by knocking/sweeping dirt and dust from the shelves or washing down the finished containers with water. The container assembler may be

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exposed to much dust in the air during sweeping/knocking. In addition to irritating the respiratory system, the dust may contain chemical or pesticide residue. Consequently, a central vacuum system is recommended to be suspended at the assembly site to remove dirt and dust.
Vacuuming might also help reduce the spreading of plant diseases through infected soil residue on the containers.

5.13. Suitable technical aids

Overview of technical aids:

> Vacuum unit at stacking/destacking of containers
> "Stacking unit"/pallet stacker
> Small electric trolleys for internal transport
> Machine for labelling (packaging)
> Scissor lift/lifting tables
> Container/pallet wrapper
> U-shaped container trolley with large wheels
> Container trucks
> Electric stackers/trucks
> Long trolleys
> Lifting trucks
> Conveyers

The following equipment may be used for occasional handling of light/stable loads suitable for handling by one hand:

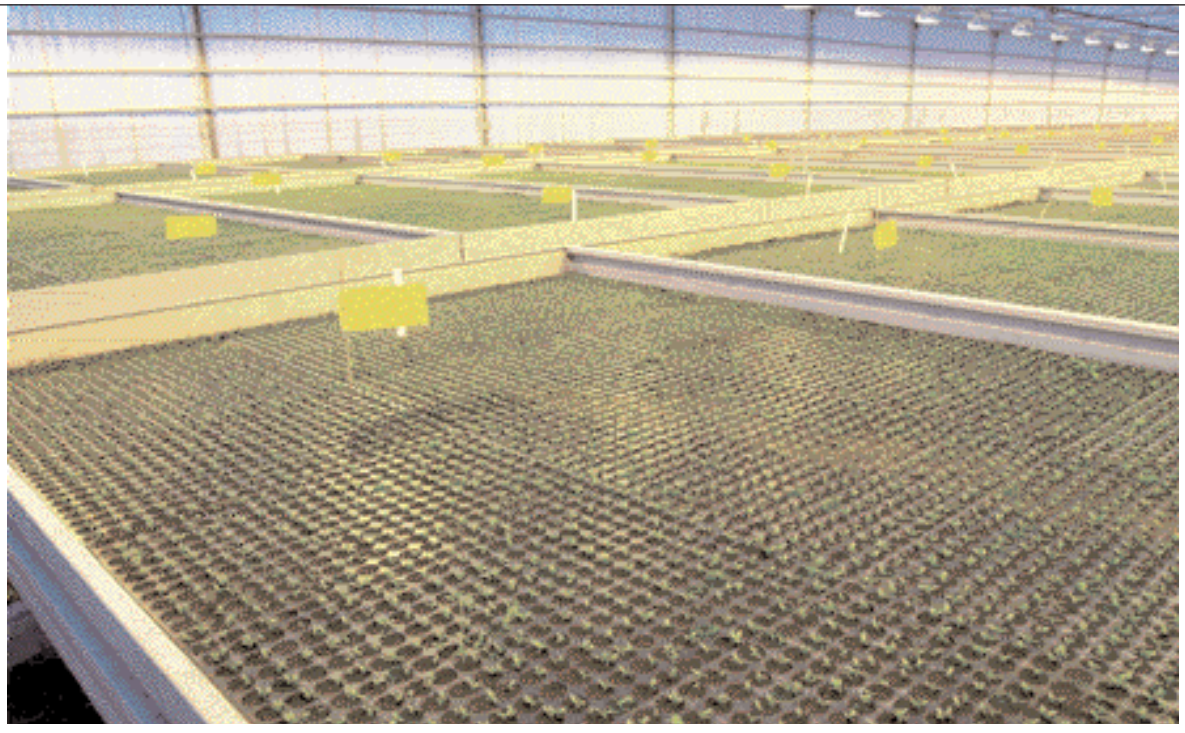
> Step ladder with wide steps and rails
> Kickstep

5.14. Training

Employee requirements change quickly as technology develops. Together with the fact that physical attrition caused by repetitive work must be avoided, this means that each employee must be flexible and be able to carry out several job functions. Consequently, it is necessary to ensure modern education with multi-functional training.

5.15. Smoking and alcohol policies

Tobacco smoke irritates the eyes and respiratory system and persons with asthma may suffer actual attacks.
Alcohol is both a safety issue and a health problem.
It is recommended that the company prepare smoking and alcohol policies.



For further information and industry guide, please contact the Danish Industry Working Environment Council, Farm to Fork, www.barjordtilbord.dk

The Danish Agricultural Working Environment Board
(Jordbrugets Arbejdsmiljøudvalg)
Agro Food Park 13
DK-8200 Aarhus N
Tel.: +45 87 40 34 00
E-mail: barjordtilbord@gls-a.dk

Employee secretariat, BAR Jord til Bord
Kampmannsgade 4
DK-1790 Copenhagen V
E-mail: barjordtilbord@3f.dk