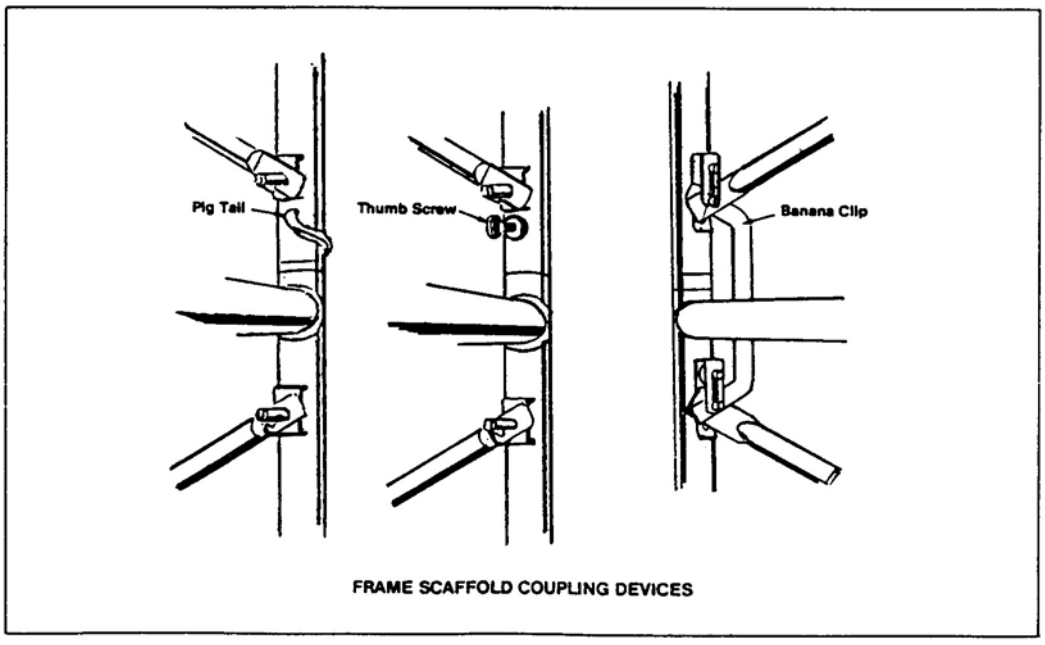
FRAME SCAFFOLD SAFETY -- PART 2

FAILURE TO INSTALL REQUIRED COMPONENTS

- **Failure to install all the parts, fittings and accessories required in accordance with manufacturer's instructions is another major cause of serious scaffold related accidents.** Sometimes parts are not available at the site while at other times haste, lack of training, or carelessness are the primary factor.

- Bracing and vertical frame coupling devices are the parts which are left out most frequently. **Inexperienced erectors often omit the frame couplers** believing that the bearing weight of the scaffold and its load will keep the frame above resting firmly on the frame below. This will probably hold true until the scaffold moves or sways sufficiently to cause the joint to pull apart and the scaffold to collapse. Several types of frame coupling devices are illustrated in the following diagram.



FRAME SCAFFOLD COUPLING DEVICES

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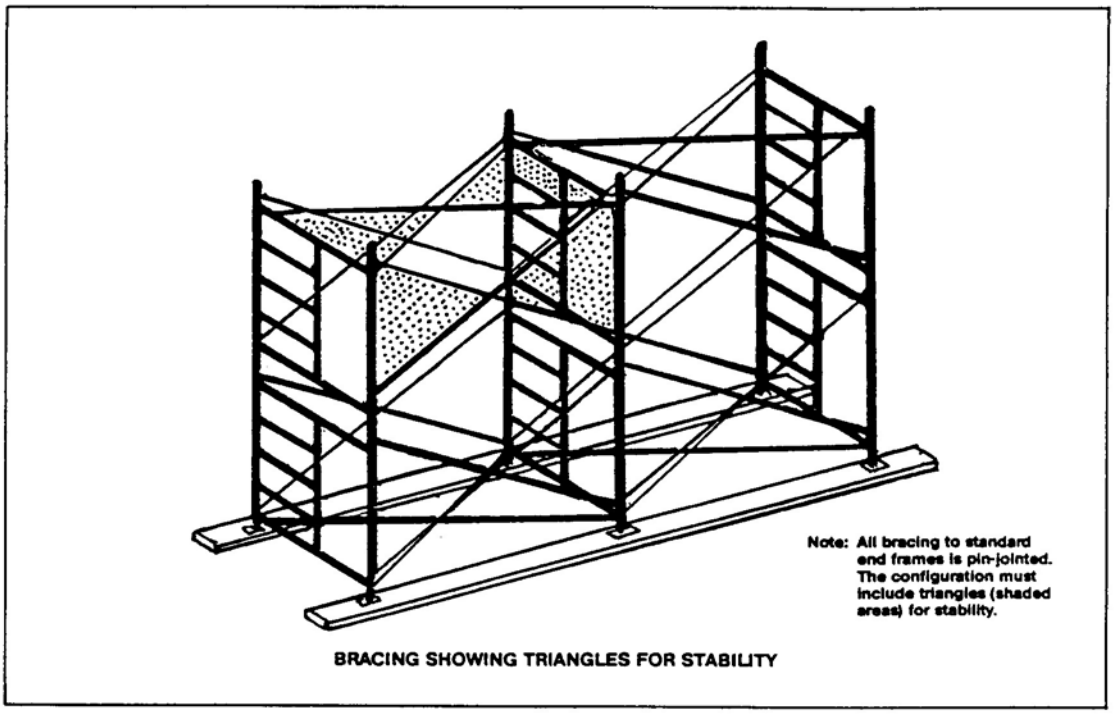
- For any structure with pin joints, such as scaffolding, the basic bracing system must be made up of triangles. Standard end frames are rigid and do not require the triangular braces. However, they are connected by pin joints and require triangular bracing in the opposite direction to the frames in both the horizontal and vertical planes as shown in the following diagram. Horizontal bracing should always be installed at the approximate elevation of tie in points.



BRACING SHOWING TRIANGLES FOR STABILITY

- **Braces should drop onto pins easily – if they don't it indicates something is wrong.** The brace may be bent or the scaffold may be twisted and out of plumb. Do not force or hammer braces onto the pins as this may cause further damage or an accident. The correct thing to do is to correct the condition causing the problem **immediately.**

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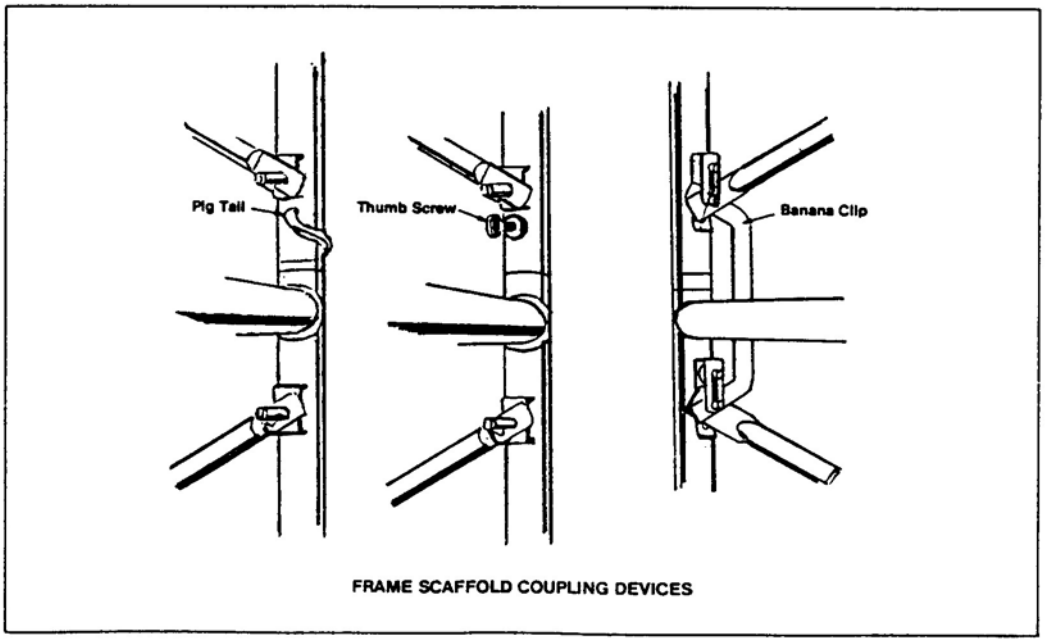
- **Bracing must also be properly secured in place** otherwise scaffold movement may dislodge an end reducing the stability of the scaffold. There are several different brace retention or locking systems found on scaffolds as shown in the diagram below. These devices must operate freely for ease of erection and dismantling and also lock securely to prevent a brace from dislodging. **Nails and other miscellaneous odds and ends should not be used in place of proper retention parts supplied by the manufacturer.**



FRAME SCAFFOLD COUPLING DEVICES

- Most bracing systems for tubular frame scaffolds are manufactured from light materials and are easily damaged by misuse or abuse. The ends are frequently bent by forcing them onto locking pins with a persuader or by dropping them onto concrete or other hard surfaces during dismantling. **Bracing should therefore be inspected before use and braces with kinks, bends, cracks or other faults discarded.**

- **If the scaffold's height to width ratio exceeds three to one then it must be tied into the building or structure, equipped with stabilizers or guyed.** For tubular frame scaffolds tie-ins should be applied at every third frame vertically and every second frame horizontally. Several methods of tying-in are illustrated below.

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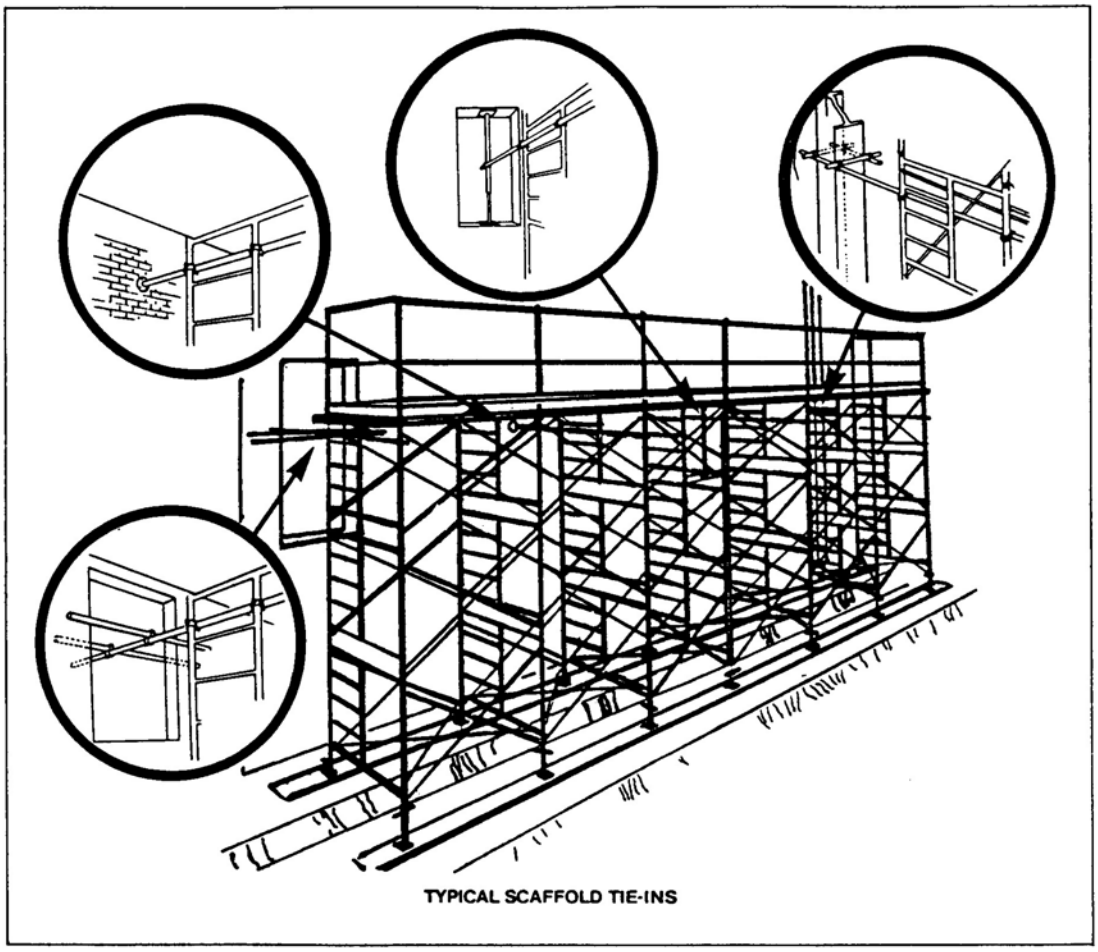

TYPICAL SCAFFOLD TIE-INS

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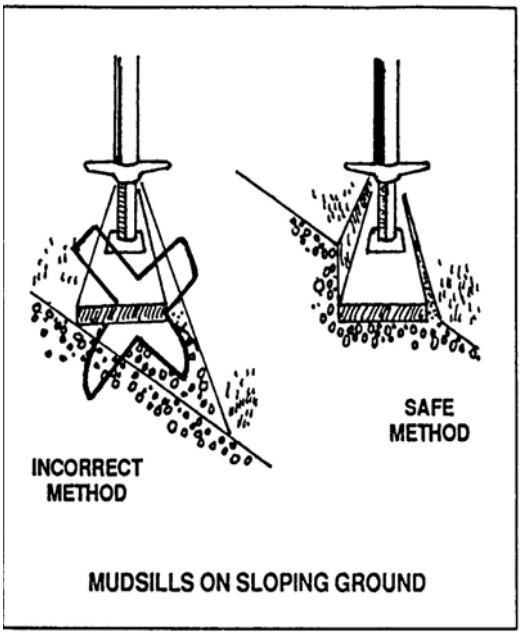
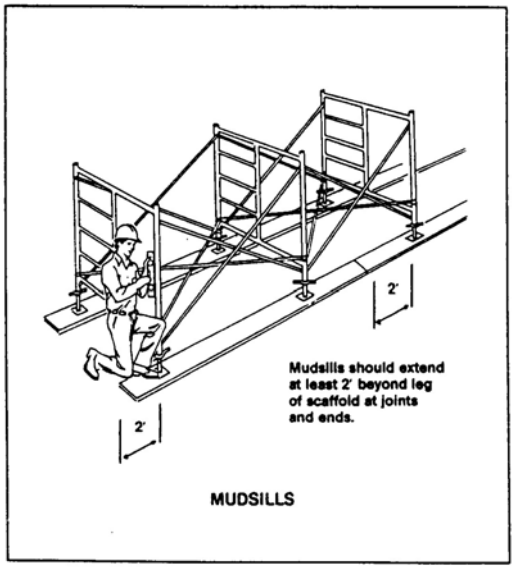
Base plates should also be used for every scaffold erection because they allow for minor adjustments to keep the scaffold plumb and level. The plates usually have holes for nailing to mudsills. This practice is strongly recommended and should be carried out as soon as the first tier is erected and plumbed with the base plates centered on the sills. To support scaffolds, backfilled soils must be well compacted and leveled. Where mudsills must be placed on sloping ground leveling should be done by excavating rather than backfilling.



- The mudsills should be a minimum of 2 x 10 plank and should be continuous under at least two consecutive supports. The sill should, wherever possible, project at least 2 feet beyond the scaffold foot at ends or where individual feet butt together. Mudsills may run either along the length of the scaffolding or across the width provided the soil conditions are satisfactory.



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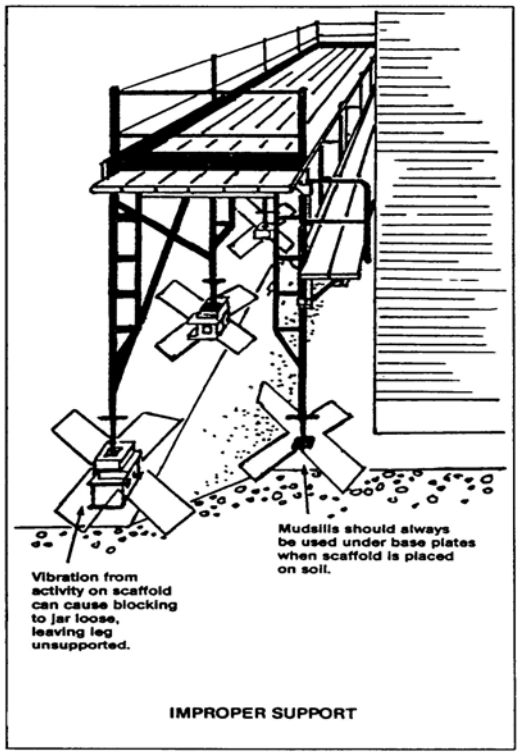
- **The use of blocking or packing such as bricks, short pieces of lumber or other scrap materials either under the scaffold feet or under mudsills is bad practice as vibration can cause blocking to move or shift and leave the scaffold unsupported.** Under such conditions the scaffold may topple when a heavy load is applied. Take particular care when erecting scaffolds on frozen ground as thawing can result in considerable loss of bearing capacity. Thawing soil is an important consideration where tarps or other covers will be placed around a scaffold loaded with masonry or other heavy materials and the enclosed area will be heated as is frequently the case during Manitoba winters.



IMPROPER SUPPORT

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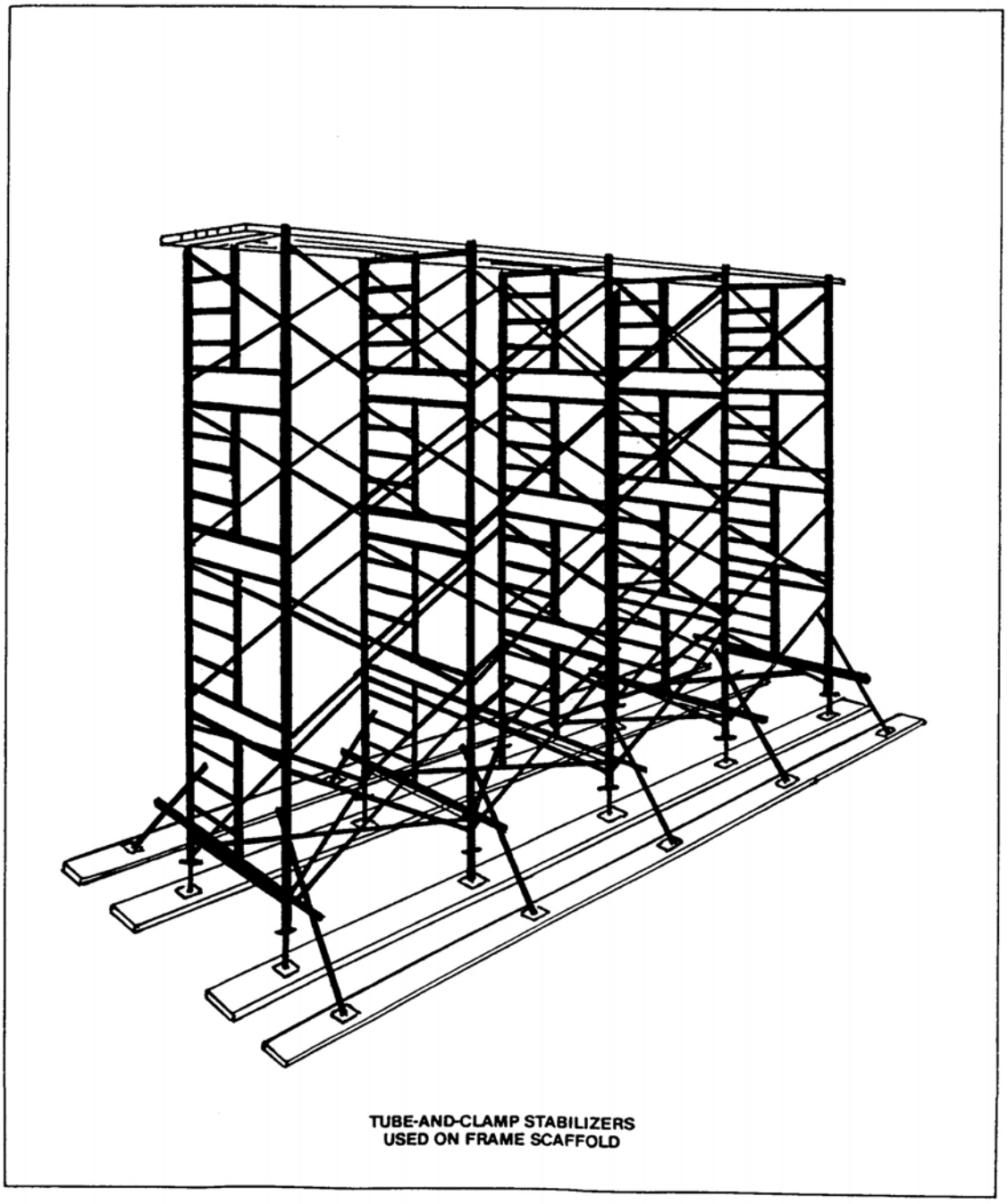
Scaffold manufacturers usually have stabilizer arms which may be attached to their equipment to improve stability. Tube and clamp stabilizers are often used with tubular frame scaffolds because the stabilizers can be adjusted after each move to ensure adequate contact with the support surface. See diagram below.



TUBE-AND-CLAMP STABILIZERS
USED ON FRAME SCAFFOLD

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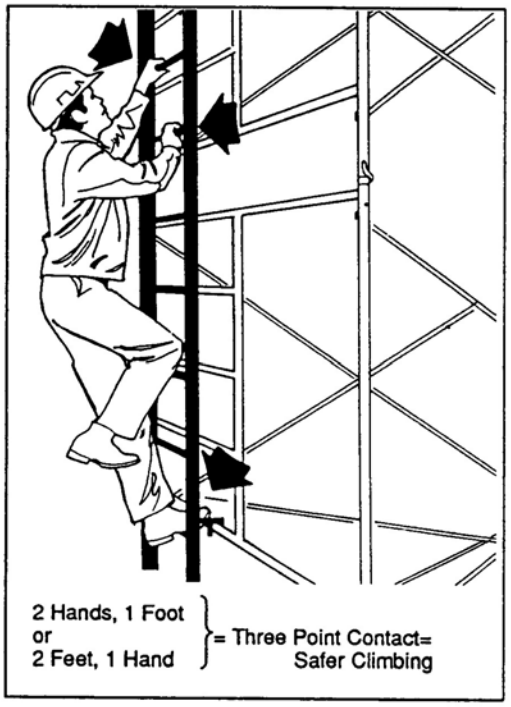
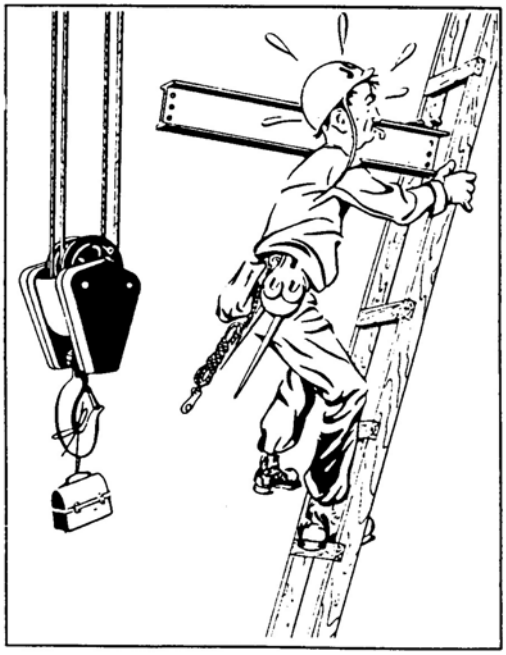
CLIMBING UP AND DOWN

Getting on and off the ladder at the platform level is often the action which leads to a fall therefore it is best to have both hands free to hold guard rails or ladder rungs. **The experienced worker will always maintain three point contact using two hands and one foot or two feet and one hand when ascending or descending from scaffold platforms.**

Avoid carrying anything you don't have to when climbing up to the working platform. The worker below is working harder not smarter and risking an accident.





One of the major problems with ladders built into the frames is that the platform planks sometimes stick out so far that it is difficult to get from the ladder to the platform. This situation can be overcome in one of three ways described on the following page. Some methods may not be practical in all situations.

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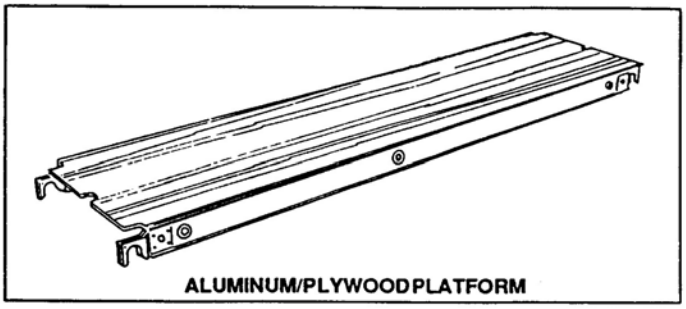
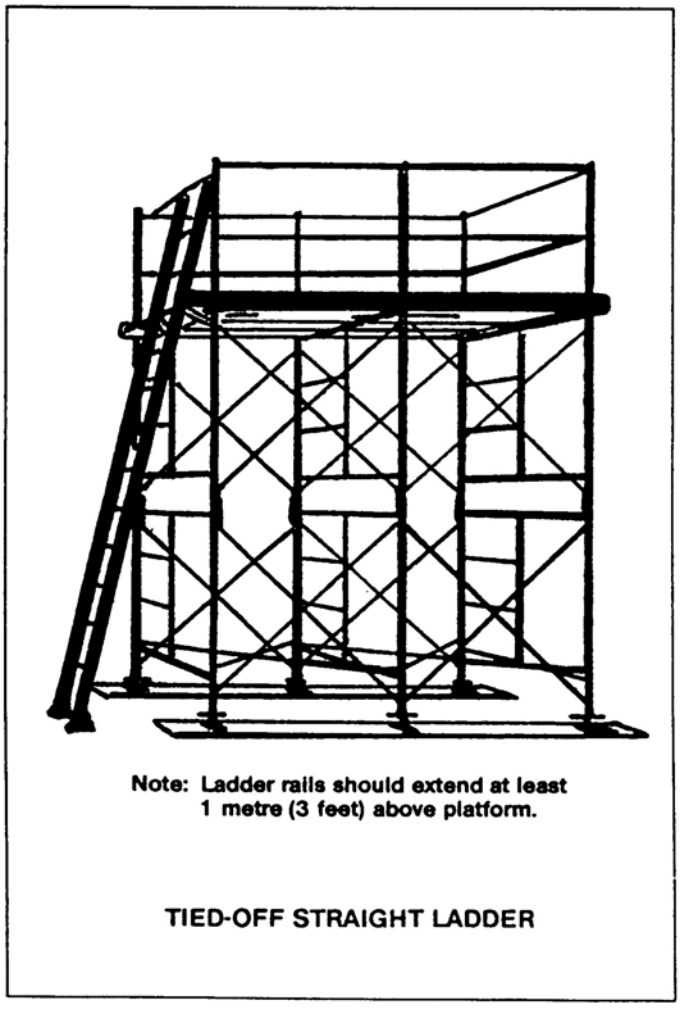
- Use manufactured platform components which do not project beyond the platform supports **if they are suitable for the type of work you are going to do.**



ALUMINUM/PLYWOOD PLATFORM

- Use an attachable vertical standoff ladder like the one on the diagram on the previous page which illustrates 3 point contact.
- Use a portable ladder where the height of the working deck is nine meters or less. Remember that the ladder rails should extend at least 1 meter (3 feet) above the platform level so that it is easy to get on and off and also to tie off the ladder to prevent it from falling over sideways.



Note: Ladder rails should extend at least 1 metre (3 feet) above platform.

TIED-OFF STRAIGHT LADDER

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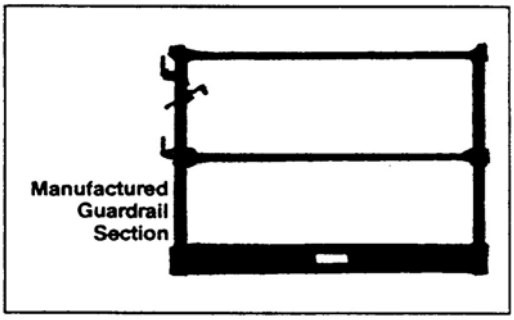
FAILURE TO INSTALL GUARDRAILS

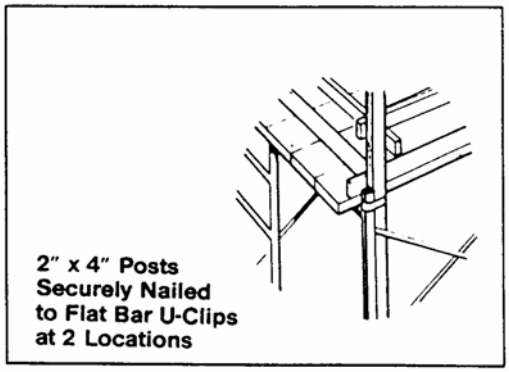
- When a scaffold reaches the required height a guardrail should **always** be installed.

- **Manitoba construction safety regulations require guardrails to be installed on the open sides and ends of all scaffold platforms more than 2.5 meters (8 feet) above the level which a worker may fall to.**

- Manufacturers of scaffolds have guard rail sections, complete with top rails, mid rails and toe boards that can be quickly and easily attached. These sections have been designed and built so as to comply with safety standards when fastened according to the manufacturer's instructions.



- If these are not available, guardrails can be built from lumber or tube and clamp components. Lumber used for the vertical members, top mid rail should be 2" x 4". The toe boards should be 2" x 6". The vertical wooden posts may be attached to the frame leg using U-clips nailed securely to the posts as shown on the right.



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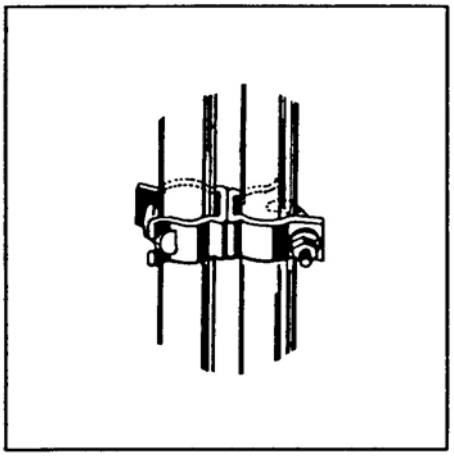
- Tube and clamp guard rail systems may be constructed from standard scaffold tubing using parallel clamps to attach the vertical posts to each of the frame legs. The vertical posts may vary from 5 to 8 feet apart, if constructed of wood, and up to 10 feet if they are part of a commercially manufactured frame scaffold system.

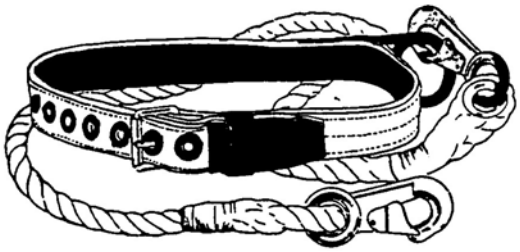


- **A properly constructed guard rail should be designed to resist a force of at least 200 lbs. Applied to any point of its structure** in order to provide reasonable assurance that it will prevent a worker from taking it down with him or from falling through it.

WORKING FROM UNPROTECTED PLATFORMS

- **The regulations permit guardrails to be removed temporarily as long as alternate protective measures such as the use of travel restraints or fall arrest systems are utilized.**

Although Manitoba construction safety regulations specify that a safety belt and lanyard are to be used, research and field studies have shown that safety belts do not provide adequate protection in the event that a worker has to be supported in the air due to the failure of a suspension, swingstage or fall.



The parachute type safety harness provides much better protections by eliminating the possibility of rollouts

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and also minimizes the extent of other physical injuries through its load distribution characteristics. Harnesses distribute impact through the thighs and buttocks whereas safety belts distribute it through the midsection where vital organs are located. If rescue is delayed after a fall, belts can seriously restrict blood flow to parts of the body resulting in permanent or temporary damage to internal organs.

Although there is no CSA standard for harnesses at the present time, certain features are recommended.

- adjustable thigh straps
- waist strap, chest strap or both
- sliding D-ring midway up the back
- strap across the buttocks to help absorb fall arrest load in an area padded and less likely to be injured.

These adjustable features make the harness snug-fitting but not unreasonably uncomfortable.

- Safety belts are suitable for travel restraint systems which prevent a worker from getting too close to an unprotected edge and applications where they serve as work belts but where continuous fall protection is required a parachute style full body harness should be used. Both systems are illustrated on the following page.

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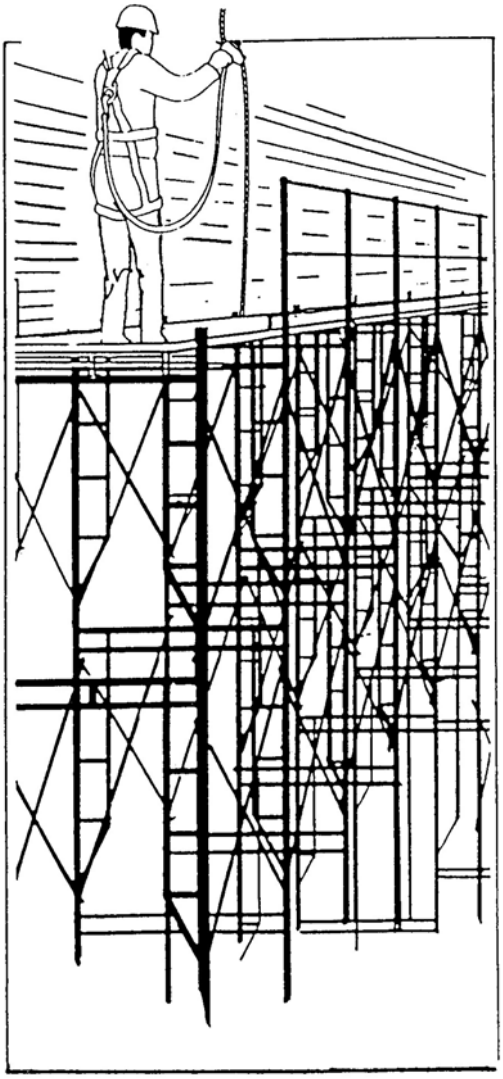
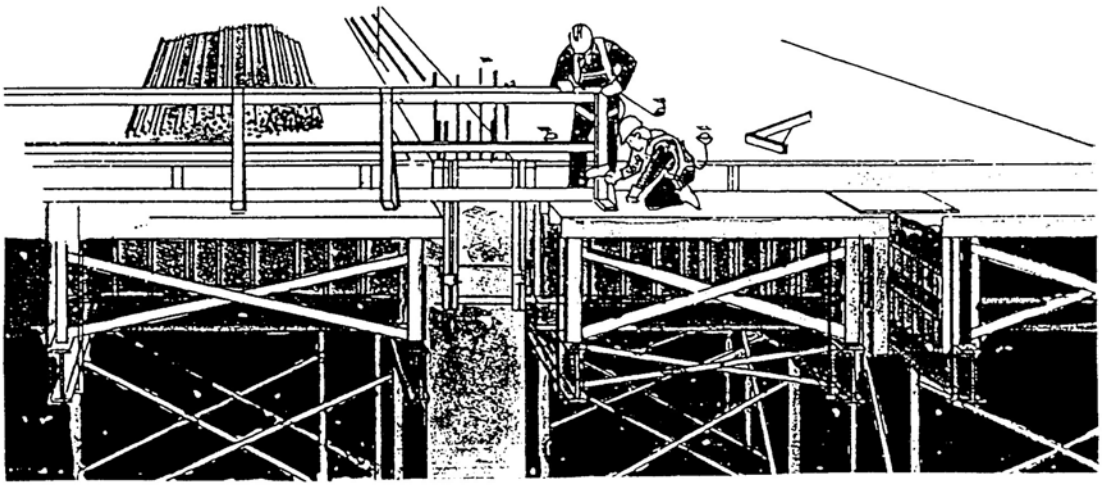
Fall Arrest System

A typical fall arrest system is worn by workers on a swingstage, scaffold, or other suspended work platform. It stops a fall within a few feet of the worker's position just before the fall. See diagram on the right.



Travel Restraint System

This system prevents falls by restraining a worker from getting too close to an unprotected edge. Travel restraint systems are not foolproof because the length of the line is not always adjusted properly. However, even if the system does not always prevent a fall it can still prevent a worker from going all the way down by arresting it.



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FRAME SCAFFOLD SAFETY – PART 2

REVIEW QUESTIONS

NAME _____

DATE _____

True or False

T F Failure to install all the parts fittings and accessories is a major cause of serious scaffold related accidents.

T F If a brace doesn't fit a pin properly then forcing it on with a hammer will usually correct the problem.

T F Bracing should be properly secured in place using the correct parts supplied by the manufacturer.

T F Base plates should be used for every scaffold erection.

T F Nailing mudsills to base plates and extending the sill at least two feet beyond the legs of the scaffold joints does little to improve safety and is not recommended.

T F The use of blocking such as bricks, short pieces of lumber or other pieces of scrap material under scaffold feet or mudsills is quite acceptable.

T F The experienced worker will avoid carrying tools or materials with him and use three point contact when going up and down scaffold ladders.

T F Guardrails should always be installed on the sides and the back of working platforms.

T F A properly constructed guard rail is required to resist a force of at least 100 pounds applied to any point of its structure.

T F Construction safety regulations permit workers to work unprotected whenever guardrails are temporarily removed.

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