General and Technical Information

Usage Affecting a Product's Safe Working Load

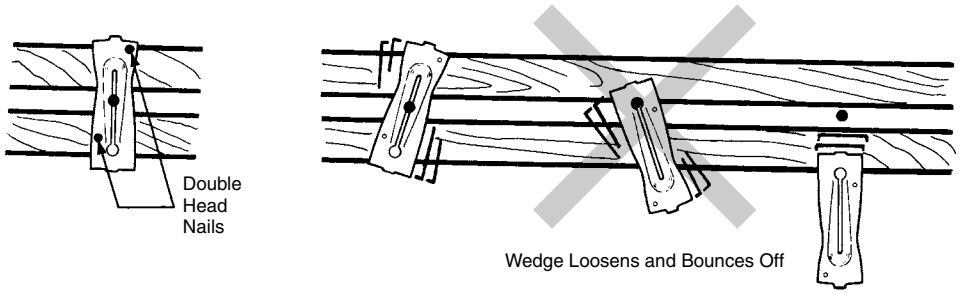
Forming accessories may be subjected to excessive wear, field modification/bending and straightening. Any product so noted must be discarded. Do not try to straighten bent forming accessories, discard and replace them. Also discard any reusable device that has experienced excessive loading, 70% or more, of ultimate load. Such items may have become brittle.

Every user must establish a control program that replaces reusable forming products after a predetermined time period or number of uses, regardless of product appearance. All reusable forming accessories shown in this publication are subject to wear, misuse, overloading, corrosion, deformation, intentional alteration and other factors which may affect the product's safe working load. Therefore, it is mandatory that the user inspect all reusable accessories to determine their condition. The frequency of inspection is dependent on factors such as frequency of use, period of use, environment, etc., and is best determined by the user consistent with good construction practices.

When in doubt about the proper use or installation of Dayton Superior forming accessories, contact Dayton Superior for clarification. Failure to do so may result in exposure of workers to safety hazards, resulting in possible injury and/or death.

All safe working loads shown in this publication contain an approximate minimum safety factor. The safe working loads were established with the following factors in mind:

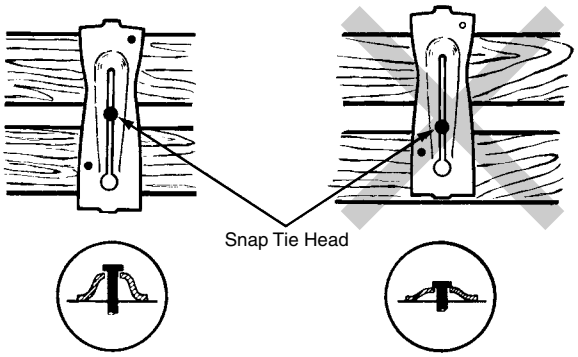
1. All safe working loads are based on the accessory being in new or in "as new" condition. The safe working load is considered to be the maximum load that should be applied to a product.
2. The safe working load of Dayton Superior Snap Ties and related products can only be developed when used in conjunction with A-16 Omni Wedges, A-81 Jahn A Brackets or A-82 Jahn C Brackets.



Right Wrong

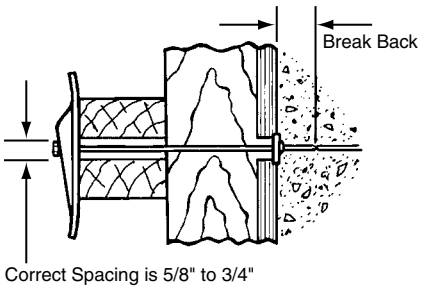
3. Care is taken to ensure that internal vibration has not caused snap tie wedges to loosen, bounce around or fall off.
4. It is important that the snap tie head and wedge be positioned properly.

   The proper tie head position is at the midpoint, or higher, of the wedge slot. The tie head must not be positioned lower than the midpoint of the wedge.



Right Wrong

5. Correct spacing between double wales, when using snap ties is 5/8" to 3/4".



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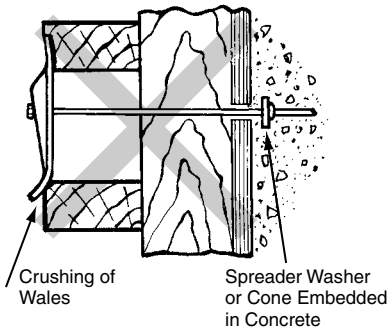
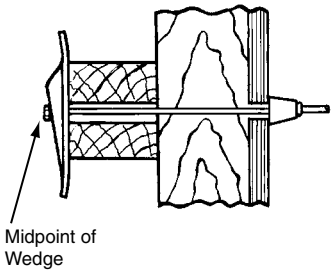


Wrong

Too much space allowed between the wales may cause crushing of the wales and/or the bending of the wedge allowing the form to bulge outward. This results in incorrect wall thickness and causes the tie spreader washers or cones to become embedded and trapped in the concrete. Trapped tie washers or cones will cause difficulties during the tie break-back operation.



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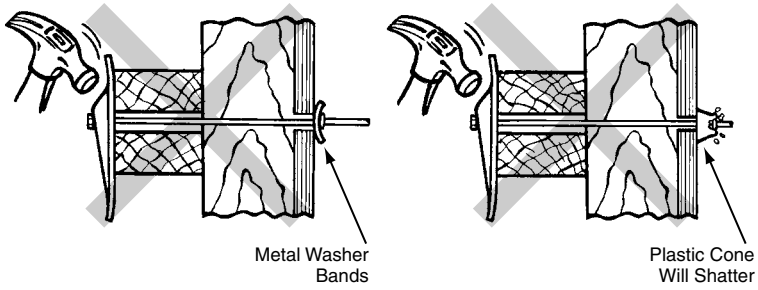
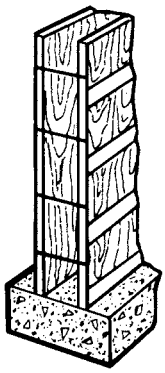


Wrong

6. The plastic tie cones and metal washers are designed to act as form spreaders only.

Do not attempt to draw-up warped wales with the wedge. Do not over tighten the wedge in any manner. Over tightening will cause metal spreader washers to bend out of shape or will break plastic cones resulting in incorrect wall thickness.

7. Care must be taken to be sure that all form ties are installed and used properly.



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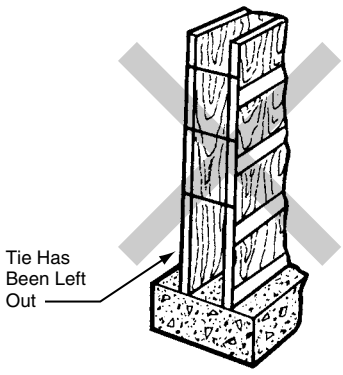

Wrong

Failure to install all of the required ties or their required mating hardware will cause excessive loads to be transferred to adjacent ties and may result in form failure.

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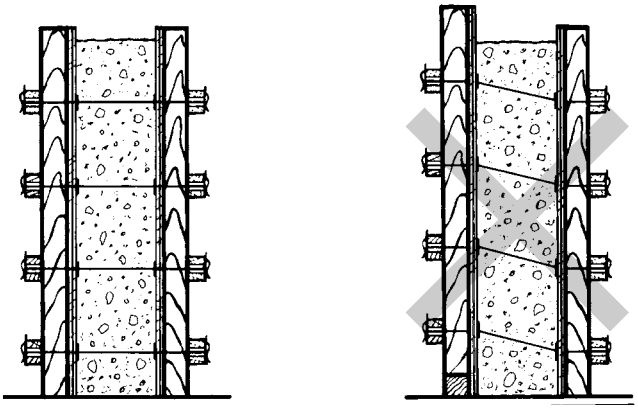
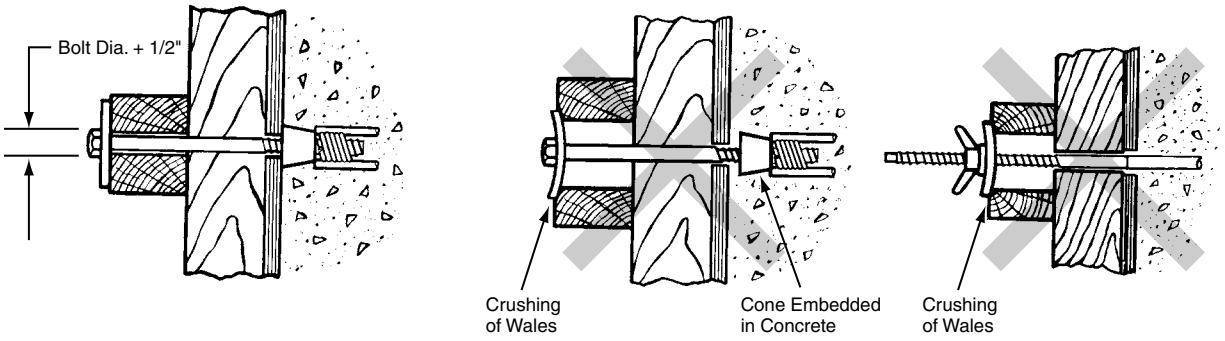
Care must be taken to ensure that form ties are properly aligned. Misalignment may result in form failure due to increased loads placed on the form ties. Misalignment may also cause damage to the form tie during installation that may result in reduced load capacities.



Right Wrong

8. When using coil bolts, coil ties, coil hanger saddles, he-bolts, taper-ties, she-bolts and other coil thread items, maximum spacing between the double wales should be 1/2" more than the nominal diameter of the bolting device being used.



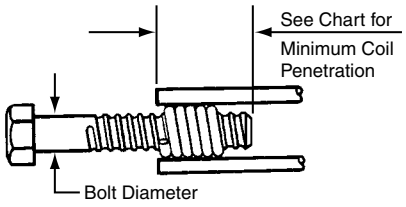
Right Wrong

When too much space is allowed between the wales, the wales may crush or the washers may bend. This causes the form to move outward to cause incorrect wall thickness and allowing the spreader cones to become trapped in the concrete. The higher than anticipated lateral form pressure can also deflect the washers resulting in incorrect wall thickness.

9. Coil bolts, coil rod and other coil thread products must have proper coil penetration. A bolting device with proper coil penetration will extend past the coil a minimum of one diameter of the bolting device. For example a properly penetrating 1/2" diameter coil bolt will extend past the coil a minimum of 1/2". Incorrect penetration of threaded items may result in form failure.

Bolt Diameter	Minimum Coil Penetration
1/2"	2"
3/4"	2-1/4"
1"	2-1/2"
1-1/4"	2-1/2"
1-1/2"	3"

Right



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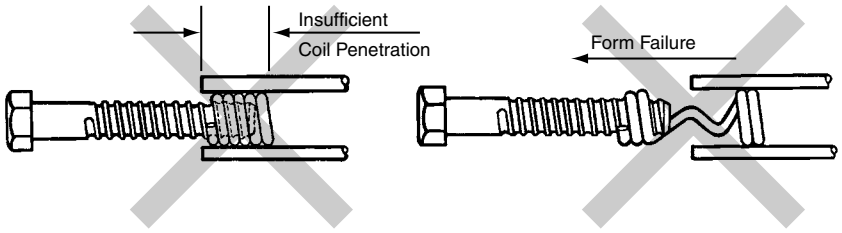
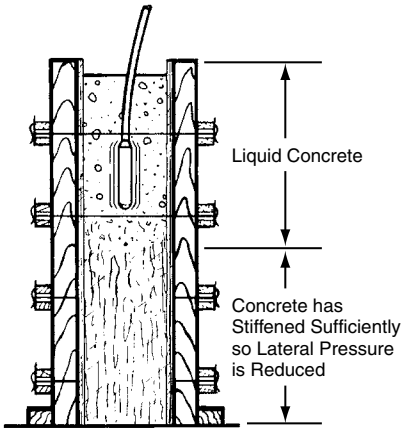


Failure to obtain proper penetration will cause excessive wear on the first few threads of the bolt, but more importantly it places the entire bolt load on a smaller portion of the coil welds. The increased loading can cause the coil welds to fail and result in form failure.

10. Do not beat on the end of loop ties to force them into position. This may damage the tie and result in form failure.
11. Use only correct length form ties. Incorrect length ties, when mixed with correct ones, will cause a transfer of lateral pressure to adjacent ties and may result in form failure.
12. Do not climb on form ties.
13. Do not use impact wrenches to tighten form-tying devices.
14. Do not over-vibrate the concrete. Excessive vibration will cause concrete at the bottom of the form to remain in a liquid state longer than expected. This will result in higher than anticipated lateral form pressure and may result in a form failure. Depth of vibration should be limited to within four (4) feet of the top of the fresh concrete.

Right



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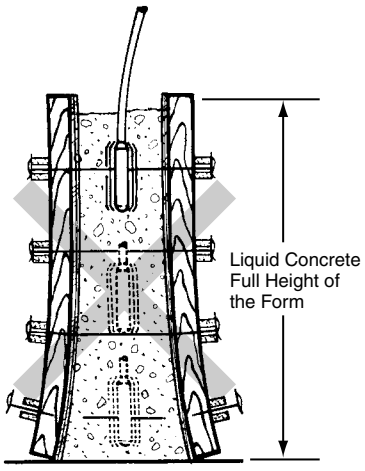

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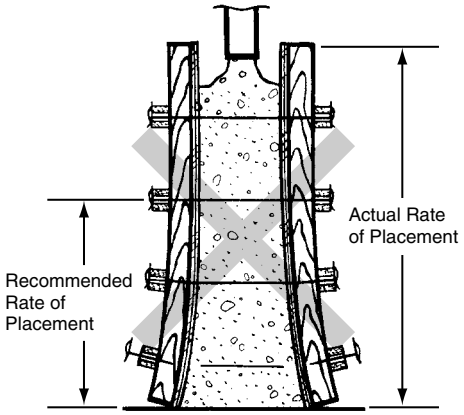
15. Do not exceed the recommended rate of placement and do not continue to place concrete while the concrete in the bottom of the form is still in a liquid state. A form failure may result.
16. Do not use forming accessories with underrated working parts.
17. All forming accessories and related hardware must be of proper length, diameter and capacity. If a greater safety factor is necessary for any reason, the user must reduce the safe working load accordingly.
18. Extreme caution must be used when welding any forming system item. Welding may affect material properties resulting in lower product performance. It is necessary to have a good working knowledge of materials, heat treating and welding procedures before welding any forming accessory. Since Dayton Superior cannot control field conditions or workmanship, Dayton Superior **does not guarantee** any product altered in any way after leaving the factory.

Wrong

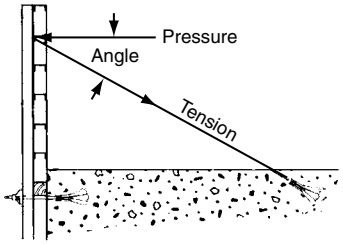


Induced Tension Loads

It is important to remember that tying at an angle causes an increase in the tension that is applied to the angled tie. The table lists various angles and the corresponding multiplication factor to use in calculating the tension load in an angled tie.

Angle	Multiplication Factor
15°	1.04
30°	1.16
45°	1.42
60°	2.00

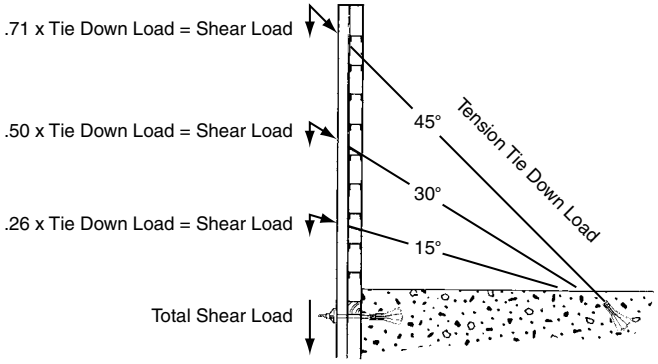
Note: Tension = Pressure x Multiplication Factor



Induced Shear Loads

It is important to remember that tie downs placed at an angle will produce shear loads as shown. The total shear load may be several times greater than the shear load produced by the weight of the form alone.

Both tension and shear loads must be taken into consideration when deciding which form tie system to be used for a particular forming application.



Combined Shear and Tension Loads

Form accessories and inserts that are subjected to combined shear and tension loading should satisfy the following equation:

$$\left(\frac{f_v}{F_t}\right)^{5/3} + \left(\frac{f_t}{F_V}\right)^{5/3} \leq 1.0$$

Where
f_t = induced tension load,
F_t = insert tension safe working load or bolt tension safe working load whichever is less,
f_v = induced shear load,
F_v = insert shear safe working load or bolt shear safe working whichever is less.