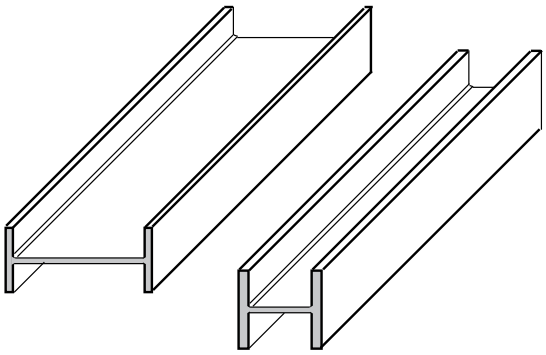
Load Restraint Guideline
Welded Beams & Columns

SS

1. This Guideline applies for:

- Welded Beams (WB700 to WB1200 sizes)
- Welded Columns (WC350 to WC500 sizes)

These welded beams and columns are unpainted, in an "as fabricated" state, and loaded web horizontal on base dunnage or other product, (assumed friction co-efficient μ = 0.40).



2. Essential Requirements

- ✓ Hardwood dunnage minimum 100 mm x 100 mm on the trailer deck.
- ✗ **Do NOT** use intermediate dunnage (see Fig 2.1).
- ✓ Vertical dunnage is not usually required, but if needed to allow unloading it is to be secure so it does not come out in transit, see Fig 4.4.
- ✗ **Do NOT** use webbing straps. They are not suitable for these products due to the sharp corners and the need to belly wrap some loads.
- ✓ Chains must be 8 mm transport chain to Australian Standard AS4344 and have a minimum 3.0 tonne lashing capacity.

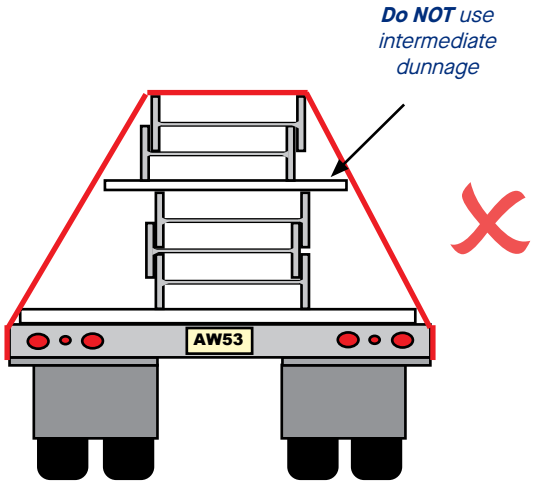


Fig 2.1 ***Do NOT*** *use intermediate dunnage in the stack. Point loading at the flange ends may cause the dunnage to break.*

3. Chaining Requirements

- ✓ The minimum number of 8mm transport chains required is shown on Table 1.
- ✓ Minimum 2 chains over/around every stack of product.
- ✓ **For most loads**, the lashing chains may be the simple **"over the top" chains**, clamping the load to the deck. (See Section 4).
- ✓ For a small number of loads, belly wrapping can be used **only** where the lashing angle is < 30 degrees and consist of single stacks. (See Section 5 for details).

Table 1. Mass Limits per Chain

Chain Angle to Horizontal ∠	Maximum Mass per Chain
Steep Angle Greater than 60°	**5.2 tonnes/chain**
Medium Angle 30° - 60°	**3.0 tonnes/chain**
Low Angle Less than 30°	**4.5 tonnes/chain** ***ONLY if all chains are belly wrapped & loads are single stack***

4. "Over The Top" Chains

- Chain angle must be greater than 30 degrees to horizontal (coaming rail). (Refer to Table 1 for chaining requirements).
- Stack(s) of WBs/WCs should be locked together. (See Fig 4.2 to 4.5).

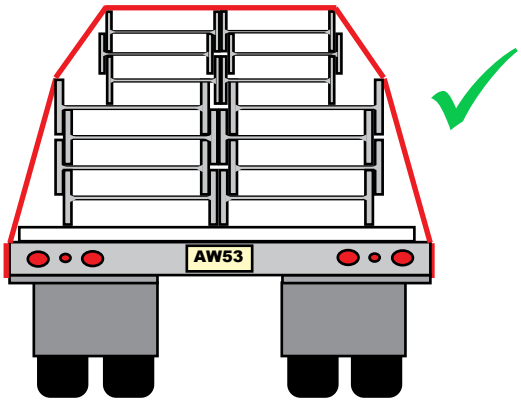


Fig 4.2 Typical double stack load of WBs, locked together with "over the top" chains, no gaps.

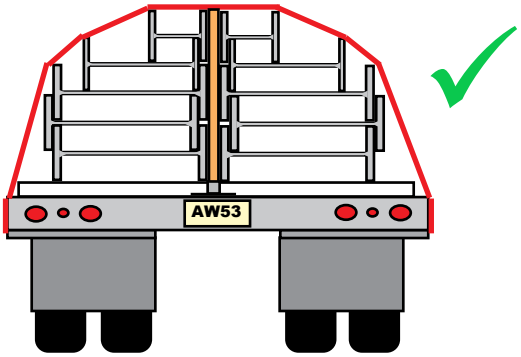


Fig 4.4 Loads with vertical dunnage may be restrained by "over the top" chains only if the vertical dunnage is secured so that it can not come out in transit. An option is to tie dunnage with wire to the chain or adjacent beams/columns, or lock together between stacks.

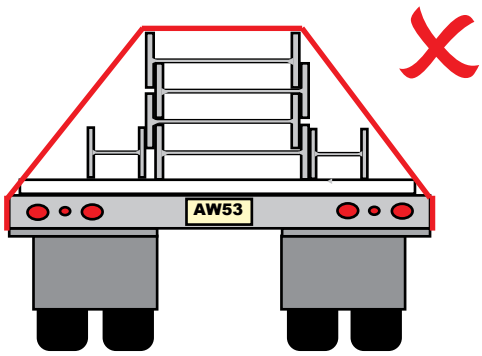


Fig 4.6 Outside columns not clamped by "over the top" chains.

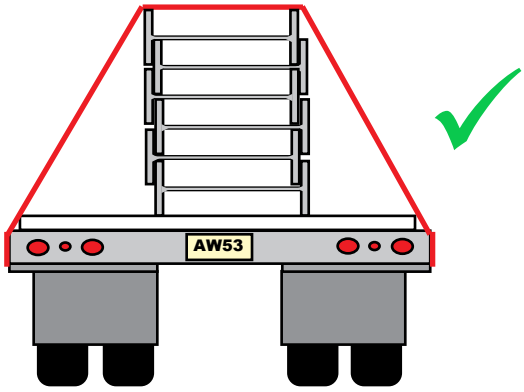


Fig 4.1 Typical single stack load of 900WBs, with base dunnage and "over the top" chains.

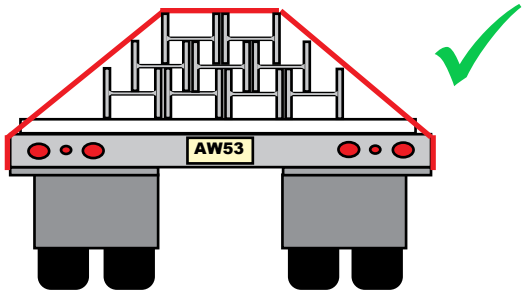


Fig 4.3 Typical pyramid load of 400WCs, locked together with "over the top" chains.

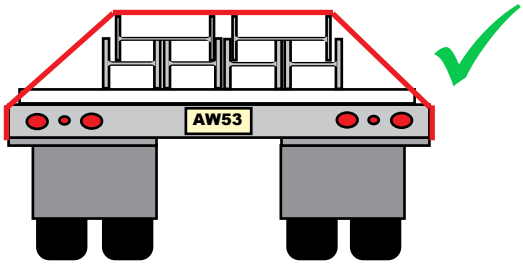


Fig 4.5 Load of beams on columns, locked together with "over the top" chains.

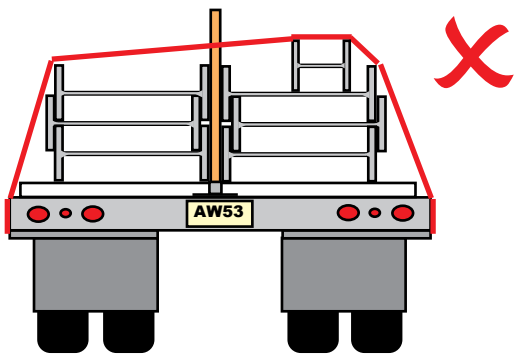


Fig 4.7 Single columns should not be placed inside beams or to one side of the load. Lock together in the centre of the load (see Fig 4.4).

5. "Belly Wrapped" Chain Situations

- Where chain angle is less than 30 degrees to horizontal (coaming rail). (Refer to Table 1 for chaining requirements).
- Belly wrapping can only be used on single stacks where the lashing angle is 30 degrees or less. (See Fig 5.1).
- **Do NOT** load more than one stack across the trailer deck when belly wrapping with chains. (See Fig 5.2 & 5.3).

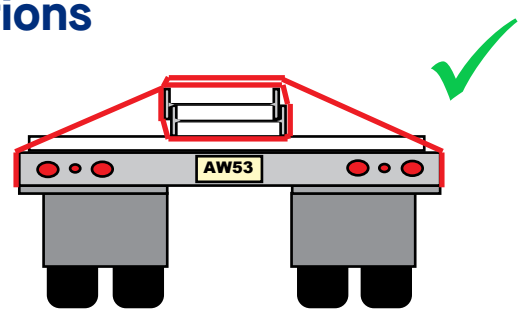


Fig 5.1 Belly wrapping is required where loads are low on the deck and ordinary "over the top" chains will not provide enough downward clamping.

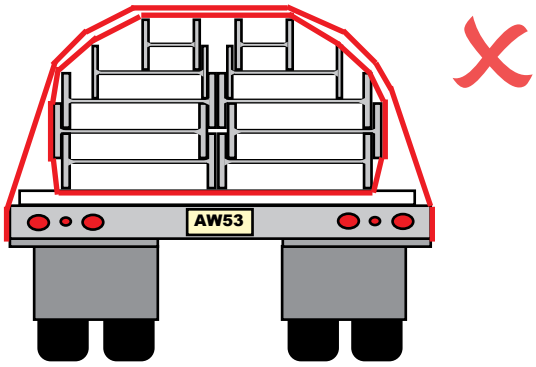


*Fig 5.2 **Do NOT** use belly wrapped chains on multiple stacks.*

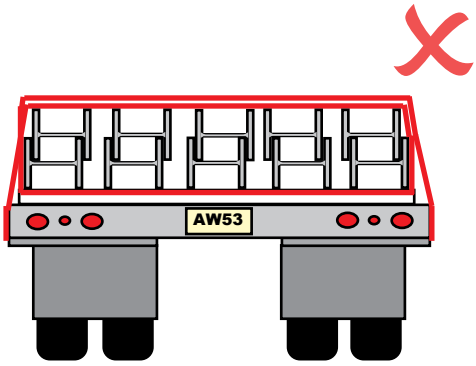


*Fig 5.3 **Do NOT** use belly wrapped chains on loads with gaps as the chains will loosen and allow excess forward movement.*

6. Gaps in the Load

- Vertical dunnage **MUST** be securely fixed. Unsecured dunnage is at risk of falling out. (See Fig 4.4 & 6.2).
- **Do NOT** load multiple stacks with gaps without vertical dunnage in place. (See Fig. 4.4 & 6.1).

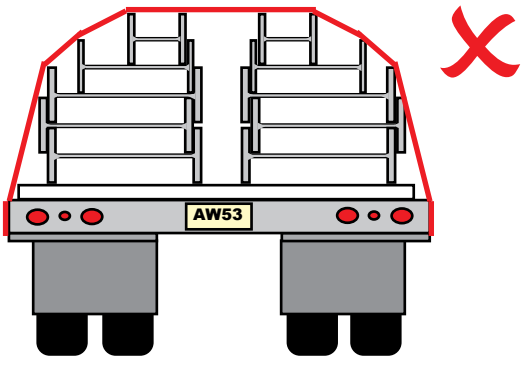


*Fig 6.1 **Do NOT** have load with gaps on multiple stacks. Loads with gaps between bundles allow the restraint to loosen.*

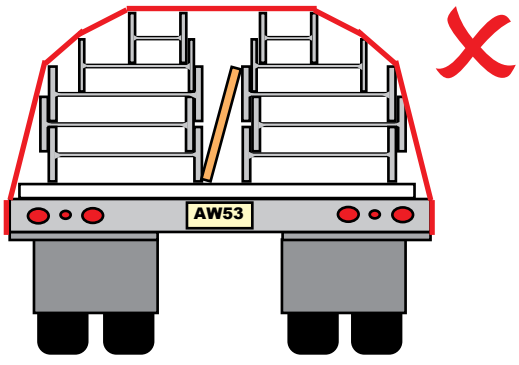


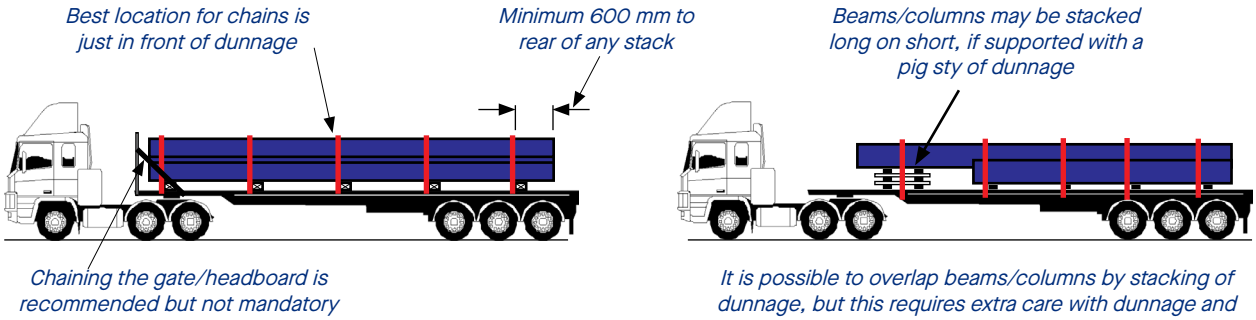
Fig 6.2 Loads with vertical dunnage that is not securely fixed in place is at risk of coming out during transit.

7. Loading of Trailers

Notes:

- Actual loading arrangements will vary with product configurations. The diagrams shown are only indicative examples.
- Staggers up to 100 mm are permitted between product layers to assist with unloading.

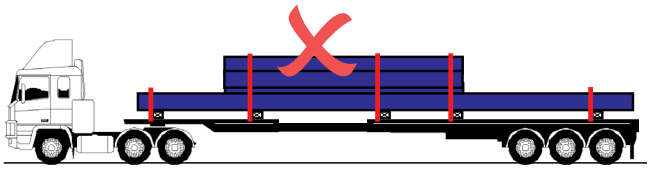
7.1 Standard Trailers



7.2 Extended Trailers

Caution:

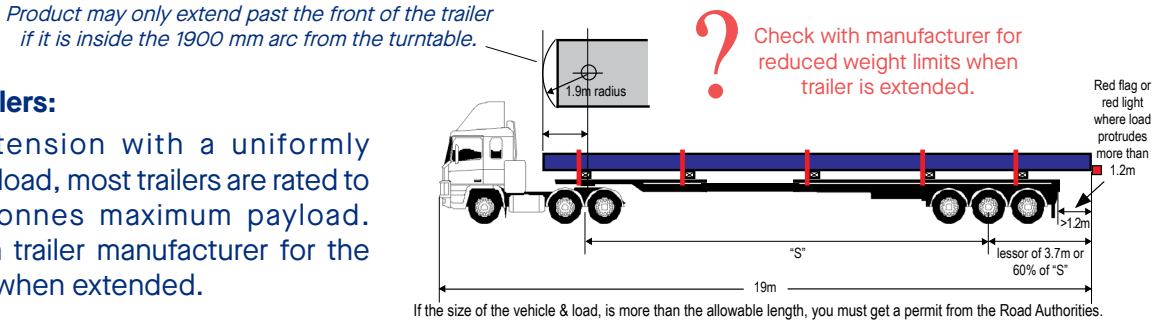
Most extendable trailers can carry only part weight when opened out to increase length. Check with trailer manufacturer for the capacities when extended.



Do NOT *stack the majority of the weight over the centre of extendable trailers.*

Typical Trailers:

At full extension with a uniformly distributed load, most trailers are rated to 12 to 18 tonnes maximum payload. Check with trailer manufacturer for the capacities when extended.



Point Loading:

For rigid products, like welded beams and columns, most trailer manufacturers allow full weight capacity of the trailer if the load is concentrated over the turntable and tri-axle wheel group. These rigid loads are self-supporting, as they do not bend along their span.