Training aid only. It does not replace approved equipment specific familiarisation or professional judgment. Apply current law, official publications, the vessel's procedures and the Master's standing orders.

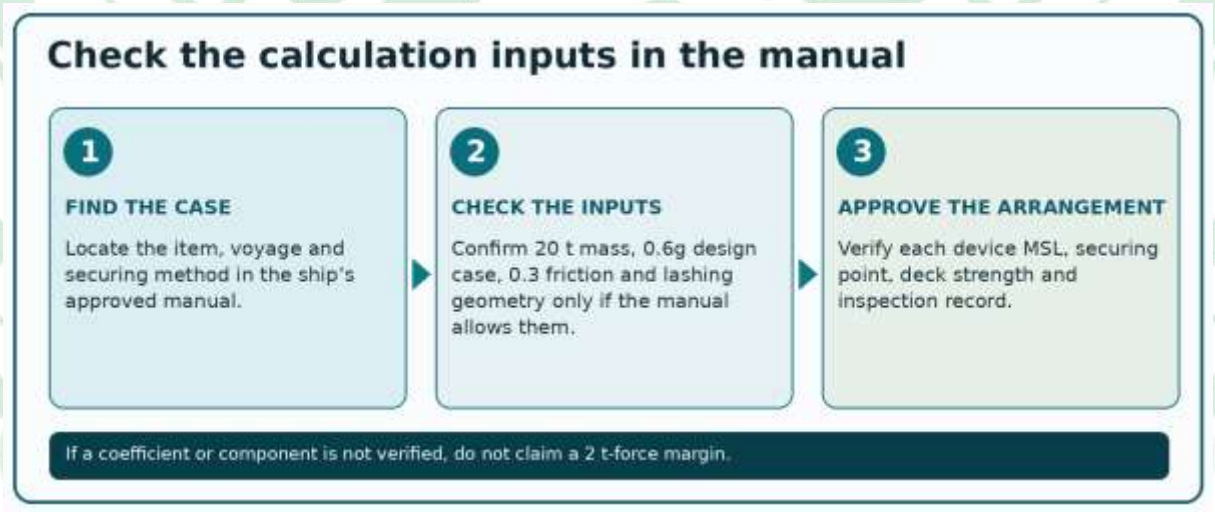
Cargo Securing and CSS Code Awareness Handout

This handout summarises the key knowledge and decision-making principles students need for effective revision and practical application. It is intended to complement, not replace the complete course materials.

Lashing Equipment Inspection

Worked example: Equipment checks

Welcome to the worked example on manual and equipment checks. The force balance shown in this course uses a 20 tonne item, a 0.6g lateral design case, a friction coefficient of 0.3 and 4 lashing components. Each number must be supported by the ship's approved Cargo Securing Manual and the actual stow. Check the equipment maximum securing load, the lashing angles, their attachments and the deck foundation. If any assumed input cannot be verified, the nominal 2 tonnes-force margin is not an approved result. Correct the arrangement through the ship's procedure before sailing.



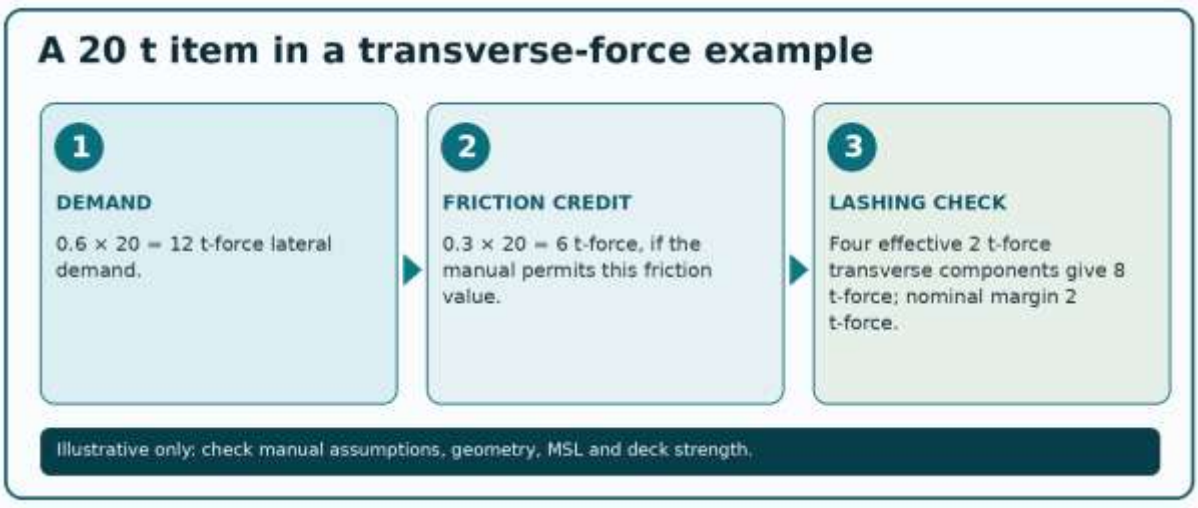
If a coefficient or component is not verified, do not claim a 2 t-force margin.

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Forces Stability and Ship Motion

Worked example: Transverse force

We will work through a simple transverse force screening example. Suppose a 20 tonne item has an illustrative design acceleration of 0.6g. The lateral demand is equivalent to 12 tonnes-force. If the applicable Cargo Securing Manual permits a friction coefficient of 0.3, friction contributes 6 tonnes-force. 4 lashings each providing an effective 2 tonnes-force transverse component would provide 8 tonnes-force, leaving a nominal margin of 2 tonnes-force against the remaining demand. This simplified example is not a final securing design. Confirm the acceleration, friction value, lashing angles, equipment limits and deck strength using the approved Cargo Securing Manual.



Illustrative only: check manual assumptions, geometry, MSL and deck strength.

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Containers and Unitised Cargo

Worked example: Cargo calculations

This example shows why the same numbers cannot be copied to a different cargo. An item that weighs 20 tonnes may have a different centre of gravity and load path when it is a vehicle, container or project load. The full rating of a lashing is not its transverse component: the component depends on the direction and angles of the restraint. The 6 tonnes-force friction credit also depends on the approved contact conditions. Match the cargo type and stow to the ship's Cargo Securing Manual before repeating the calculation and confirm that the forces reach suitable securing points and structure.



Use actual geometry and approved coefficients; do not copy a worked answer between cargoes.

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Voyage Inspections and Adjustment

Worked example: Securing items after heavy weather

Consider the illustrative secured item after heavy weather. The original calculation showed a nominal 2 tonnes-force margin under its assumed conditions. A damaged or slack lashing can invalidate that result. Inspect only when conditions and access permit, and record any movement, loosening or damage. Tell the responsible officer and use the ship’s approved procedure to decide whether adjustment, route or speed change, or a different stow is needed. Do not work near unstable cargo or under a moving load just to restore the numbers on a worksheet.



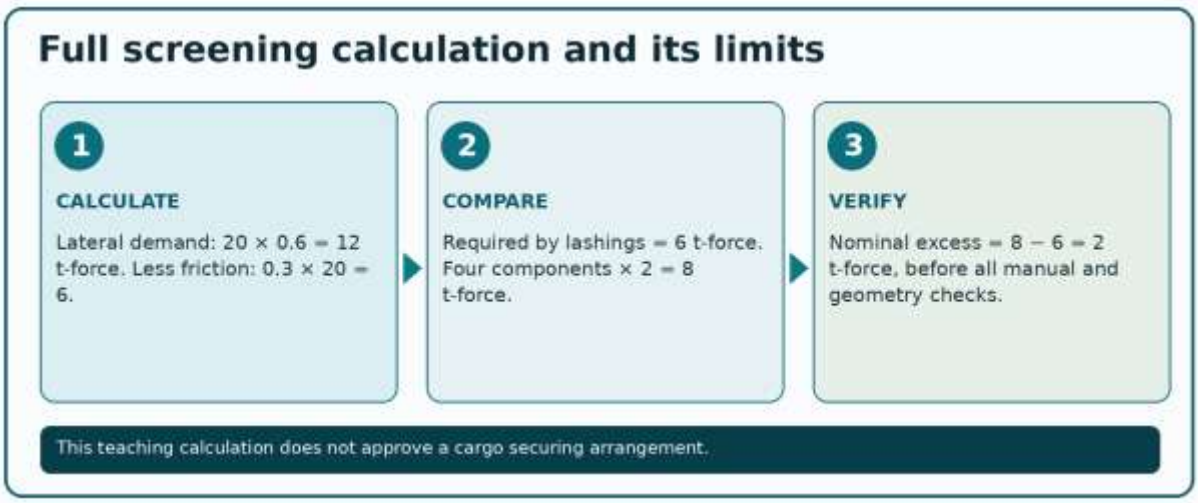
Risk to crew and ship movement control access; never enter an unsafe area.

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Cargo Shift Emergency Response

Worked example: Emergency response

Let us calculate the complete illustrative force balance aloud. A 20 tonne item subject to a 0.6 g transverse design case gives a lateral demand equivalent to 12 tonnes-force. At an assumed friction coefficient of 0.3, the friction credit is 6 tonnes-force. 6 tonnes-force of transverse restraint therefore remains. 4 lashings that each provide a verified effective component of 2 tonnes-force would supply 8 tonnes-force. 8 minus 6 leaves a nominal excess of 2 tonnes-force. This is a screening exercise only. The actual approved calculation uses the ship's Cargo Securing Manual, the real lashing geometry, maximum securing loads, securing points and structural limits.



This teaching calculation does not approve a cargo securing arrangement.

Source for further study: IMO Code of Safe Practice for Cargo Stowage and Securing (CSS Code), https://www.imo.org/en/ourwork/safety/pages/css-code.aspx. Use the ship's approved Cargo Securing Manual for any actual calculation.

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Module Technical Checkpoints

Use each checkpoint with the module decision map. Confirm the current ship procedure, equipment limits and operating conditions before taking action.

Regulatory currency: 2026 SOLAS V/31 and V/32: report lost containers under the applicable ship and flag process; record position and circumstances.

Module	Worked action	Evidence and decision
1. Cargo forces ship motions and securing principles	Identify cargo mass, geometry, centre of gravity and stow.	Use the acceleration and method from the approved manual. Check friction, securing points and effective lashing components.
2. Cargo Securing Manual and equipment inspection	Locate the approved manual and correct arrangement for this stow.	Match each item and point to its approved capacity. Inspect condition, attachment and lashing geometry.
3. Containers vehicles project and heavy cargo	Confirm cargo mass, dimensions and centre of gravity.	Check support, deck limits and proper cargo-specific devices. Use the approved securing arrangement and rated points.
4. Voyage monitoring and heavy weather response	Inspect when conditions permit, following ship procedures.	Report movement, slackening or damage immediately. Reassess securing, route, speed and safe intervention.
5. Securing calculation workshop and failure investigation	Collect cargo particulars, approved method and drawings.	Recheck measured angles, friction assumptions and ratings. Compare inspection records with actual damage and motions.

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Cargo Securing and CSS Code Awareness Key Checklist

Vessel or workplace	Date	Completed by	Reviewed by

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Prepare

☐ Confirm scope, authority and applicable current procedure.

☐ Identify hazards, operational limits and interfaces.

☐ Confirm competent people, equipment, communications and contingency.

☐ Brief roles, stop criteria and reporting expectations.

Execute

☐ Follow the approved sequence and verify critical steps.

☐ Maintain situational awareness and challenge unexpected conditions.

☐ Stop, make safe and escalate when limits or assumptions are no longer valid.

Monitor

☐ Use objective indicators and independent checks where appropriate.

☐ Record significant events, deviations, decisions and communications.

☐ Manage fatigue, workload and handover.

Close out

☐ Verify safe restoration or completion.

☐ Account for people, equipment and records.

☐ Debrief, report defects and assign corrective actions with effectiveness checks.

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Anchoring and Anchor Watchkeeping Pre Task Briefing Checklist

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☐ Objective and scope understood.

☐ Applicable procedure and current information available.

☐ Authority and responsible person confirmed.

☐ Hazards, limits and interfaces identified.

☐ Roles, communications and cross checks agreed.

☐ Equipment, PPE and contingency ready.

☐ Stop criteria and emergency actions understood.

☐ Fatigue, workload and environmental conditions acceptable.

☐ Questions answered and understanding confirmed.

Briefing Record

Name or role	Responsibility	Question or concern	Confirmation

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Cargo Securing and CSS Code Awareness Defect Incident and Corrective Action Form

Vessel or workplace	Date	Completed by	Reviewed by

Do not delay urgent protective action to complete this form. Use mandatory company or authority reporting systems where required.

Field	Entry
Observed fact or event	
Immediate risk and consequence	
Immediate control and authority	
People notified and time	
Evidence protected	
Underlying or contributing causes	
Corrective action and owner	
Due date	
Effectiveness measure and review date	

Close out checks

☐ Immediate risk remains controlled.

☐ Required reports and records are complete.

☐ Action addresses cause rather than symptom only.

☐ Affected personnel were briefed.

☐ Effectiveness was tested with objective evidence.

☐ Learning was shared without exposing confidential information.