SKILLS ASSESSMENT CHECKLIST

Working at Height [Tower climbing & rescue]

The PACI tower climbing course is intended to enable a person to work on towers using appropriate fall-protection systems. Competency in this document indicates that the student can identify hazards and conduct a risk assessment, access the work position and then complete the work agreed time limits. Training must be conducted as outlined in this document. When you have completed the course, an assessment verification (AV) form and course feedback questionnaire must be mailed to PACI for processing.

Course Data:

Overall objectives:	To train students to a level of proficiency where they can: 1. Select and use PPE that is appropriate for working on towers 2. Climb a free standing lattice frame tower structure using a double hook lanyard (no fixed ladder) 3. Climb a fixed ladder fitted with a cable fall-arrest system (comms towers only) 4. Demonstrate ability to achieve a stable work position – (ie maintain a balanced position leaning back in their harness so both hands can be released to perform a task) 5. Carry out a rescue procedure (patient simulating unconsciousness) 6. Perform an abseil descent using a self-locking (ie auto locking) descending device (an important enabling skill for rescue procedures) 7. Access a target work position on a tower using a fixed rope and rope grab (rope clamp). 8. Install a fixed rope for other workers to use as a means of simplified access up the tower structure
Entry requirements:	Must be at least 18 years of age Be fit for climbing and working at height Completed the PACI tower exam
Nominal duration:	2 days
Training site:	Must have access to an actual tower (training is carried out in context on a tower at height)
Cost:	Based on business overheads and inclusion of reasonable profit margin (staff wages, travel to/from site, equipment wear & tear, office admin etc)
Maximum students:	8:1 student to instructor ratio in ideal conditions

Successful students will receive a statement of attainment: Working at Height [Tower Climbing & Rescue]

Training plan

Typical sequence of training:

Day 1: Theory (approximately 2-3 hours – requires white board)

[ ] Welcome & introductions

[ ] Overview of course training plan – explain expected training outcomes

[ ] Review exams (trainees must have completed their exam papers in ink)

[ ] Equipment requirements for working on towers (check trainee gear)

- [ ] Ensure lanyards are suited to tower climbing (must be double hook design)
- [ ] PACI advises that all students use the new WorkRight lanyard (V or Y version)

[ ] Legislation and Australian Standards (AS 1891.4) – overview – Q&A

[ ] Risk assessments & work method statement (follow State/Territory OH&S requirements) – draw up risk assessment on white board with trainees

***Note**: Trainees will be required to complete a risk assessment as part of their assessment. If the students are accustomed to using their own risk assessment documentation, you should allow them to use it.*

Practical skills (remainder of day – must be conducted at a realistic work environment)

[ ] ID hazards on site – inspect tower with trainees – is the current risk assessment and work method statement/training procedure adequate?

[ ] Fit and adjust harnesses – ensure correct adjustment

[ ] Personal safety checks (ABCDE)

- [ ] Ensure personal safety before committing to height

[ ] Climb structure using double hook lanyards

- [ ] Conduct simple exercise to accustom students to using double hooks – caution trainees to exercise due care and diligence to when climbing close to ground level
- [ ] trainees must always maintain one point of attachment at all times

[ ] Climbing a fixed ladder using a cable fall-arrester

Note: Only communications towers will have a cable fall-arrest system installed

[ ] Work positioning (using side D rings on harness) – make sure students lean back on their work positioning belt / pole strap. Students must demonstrate a hands-free work position. Pole straps will generally be constructed from rope or webbing. Ensure there is a stopper (end stop) on the webbing or rope to prevent catastrophic disconnection. Some older style web pole straps have poor or ineffective end stops.

[ ] Rescue skills

Trainees will practice three (3) different types of rescue procedures as follows:

1. Individual rescue using mini-hauler
2. Individual rescue using a cutaway (knife) procedure
3. Team rescue using a lowering system

Within the tower climbing industry, the use of a knife to cut the patient free to enable swift transfer to the rescuer is usually a viable option. However, careful consideration must be given to the exact procedures that will be taught. All rescues will generally involve the following sequence:

1. Assessing the situation (eg is the patient conscious? The patient's current position on the tower – (eg how high, on ladder/platform/structure?)
2. Accessing the patient (how will you reach the patients position on the tower?)
3. Providing immediate basic first aid / airway management
4. Method of extraction (ie lower or abseil to ground)

A. Practice using the mini-hauler to lift and transfer patient to rescuers harness

-use mini-hauler to lift & transfer patient to the rescuers descending system
-abseil descent with patient to the ground

B. Practice using a cutaway to transfer patient to rescuers harness

-use sharp knife
-caution with sharp blade – orient blade away from patient and ropes
-reduce potential for shock-loading

C. Practice using a lowering system (team practice – minimum of 3)

-involves transferring the patient to a lowering line
-this is a group exercise (minimum group of 3; two rescuers and one patient)

In all procedures, patient management is of primary concern.

NOTES:

1. An abseil rescue procedure is required if there are too many obstacles in the descent path.
2. If the descent path is relatively clear, lowering might be a viable alternative (but only if a person is standing by on the ground)
3. If cutting is deemed to be a preferred option, extreme caution must be exercised to ensure that no undue slack exists in the transfer line/lanyard. Sudden shock loads must be avoided.
4. Potential exists for the wrong line/item to be cut resulting in catastrophic loss of life.
5. Potential also exists for personal injuries if the blade should come into contact with a person's body.

Formative assessment activity:

1. Access the work position using double hook lanyards
2. Climb a fixed ladder using a cable fall-arrester
3. Rescue procedure (lower/abseil patient to ground)

DEBRIEF DAYS ACTIVITIES! – reminders for next day eg start time and outline of training plan

Day 2: Theory (1 hour – requires white board)

[ ] Overview of the days training plan
[ ] Discuss any concerns that students may have – reassure everyone
[ ] Completion of exams (clear up any outstanding issues)
[ ] Any equipment issues? – try to resolve – what is the nature of the problem?
[ ] Draw up risk assessment and work method statement/procedure to cover 2nd days training activities

Practical skills (remainder of day – must be conducted at a realistic work environment)

[ ] Accessing the work position

-using double hook lanyards
-climbing a fixed ladder with cable fall-arrester

[ ] Work positioning – must confidently use work positioning lanyard or pole strap (hands-free)
[ ] Completing a realistic task/job

-If possible, arrange for students to carry out a simple task at height – the task must be relevant and realistic
-job should incorporate hauling/lowering (a Petzl Gri Gri is ideal for light equipment)

[ ] Rescue skills

-must use live patient unless otherwise notified
-procedure to be timed – 20 mins from ground-to-ground and conducted from a position at least 10m height
-patient must be simulating unconsciousness and suspended at height
-rescuer to approach and access patient from the ground
-extraction method is at discretion of rescuer based on circumstances

NOTES:

1. During training, the patient should be positioned both inside and outside the legs of the tower to create real complexities to overcome.
2. PACI advocates the use of live patients (not dummies)
3. Cutaways are a realistic option for many tower workers. Always use a dummy cord for the procedure (do not cut actual equipment!).

Prepare for final assessment activity – briefing
Any questions?

Final assessment must capture a range of tower climbing skills in a 'holistic' process. A rescue procedure should be an integral component of the assessment process unless all students have already been confirmed as competent in rescue.

All students must be able to perform all skills without the advice or assistance of the instructor or others.

-Complete course admin/paperwork **- complete AV forms & sign logbooks**
-Passport photos required for ID cards!

MUST OBTAIN FEEDBACK QUESTIONNAIRES FROM ALL TRAINEES (seal in envelope)

TOWER CLIMBING & RESCUE COURSE

Unit MNMG237A Work Safely at Height is contextualized to working on towers. All elements and performance criteria are grouped holistically for assessment purposes. Please visit the NTIS website at www.ntis.com.au for specific details of the unit.

The PACI statement of Attainment will consist of the following units of competency (from training package MNM05).

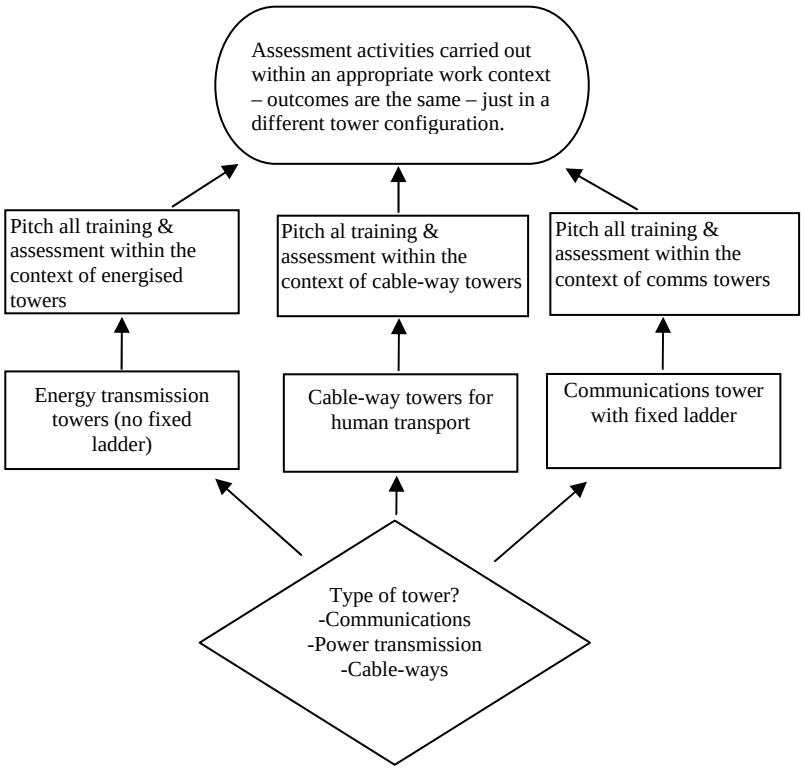
UNIT CODE	UNIT TITLE
MNMG237A	Work Safely at Heights (contextualised to tower structures)

Course start:_____ Course finish:_____

Assessor:_____ Location:_____

Trainees

1. _____
2. _____
3. _____
4. _____
5. _____
6. _____
7. _____
8. _____



Note to assessor: A tick placed in each box indicates that competency has been achieved.

SKILL	Student 1	Student 2	Student 3	Student 4	Student 5	Student 6	Student 7	Student 8

1.0 Knowledge

Competency includes the application of knowledge and skill – the PACI approach is to integrate knowledge and skill in realistic practical training and assessment activities. Exams questions directly relate to important practical skills and help the assessor identify if deficiencies in underpinning knowledge exist.

Assessed through a combination of:
[ ] written examination and oral questioning
[ ] practical application during training activities

1.1 Written exam completed [ ] all questions answered correctly								
1.2 Exam errors/mistakes are identified and corrected [ ] incorrectly answered exam questions are discussed with trainee and agreed upon								
1.3 Confirm trainee has underpinning knowledge and understanding of subject material								

2.0 Risk assessment

[ ] Assessed through practical application – trainees should prepare a permit or Job Safety Analysis (JSA or JHA) in written form
[ ] Permit or JSA to be handed in as part of final practical assessment – use current accepted organisational form for this purpose

2.1 Assess potential hazards associated with carrying out the work at height								
2.2 Identify risks associated with each hazard								
2.3 Implement measures to control risks [ ] control measures are realistic and effective								
2.4 Prepare documentation to gain approval for the work at height; eg [ ] permit for working at height [ ] Job Safety Analysis [ ] work method statement [ ] work authorisation form								

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3.0 Knots

Justification: A careful assessment of the students needs must be carried out. If at all possible, knots should be avoided. Permanently swaged rope end terminations should be used where-ever reasonable and practicable to do so. Reasonable justification for teaching knots would include:

3.1 Rescue procedures
- [ ] Figure 8 on the bight – used to create an anchor (attaching directly to a carabiner)
- [ ] Adjustable double figure 8 on the bight – as above, but more robust/stronger type of figure 8
- [ ] Prusik knot – useful in some rescue procedures

3.2 Building a lanyard (tying knots to form own lanyard – an unlikely scenario but possible in some cases)
- [ ] Alpine butterfly knot – used in a lanyard
- [ ] Re-threaded figure 8 knot – used to attach a hook directly to a rope
- [ ] Double overhand noose (ABoK #409) – used to form end terminations with rope to connector

3.3 Abseiling (ie, descending from a high work position to reach the ground in a quicker time frame)
- [ ] Figure 8 on the bight – used to create an abseil anchor (attaching directly to a carabiner)
- [ ] Adjustable double figure 8 on the bight – as above, but more robust/stronger type of figure 8

NOTE 1: Knots are assessed while used within a wider practical application eg during a rescue procedure – they are not assessed individually – PACI philosophy is to limit the amount of knots to learn to 'need to know' Vs 'nice to know'. PACI philosophy is to carefully analyse the requirement to learn and use knots – wherever possible, pre-tied or swaged rope ends with thimbles should be used. This will reduce the need to remember how to tie knots and hence reduce the likelihood of user error.

NOTE 2: In some cases, a custom made lanyard can be made up by tying knots in standard 11mm diameter kernmantel rope. Many double acting hooks have a 'captive eye' through which a rope can be attached using ABoK #409.

Justifiable knot – of all the possible knots, this would be the most likely to have practical application

End line knot

3.1 ABoK #1047 (Figure 8 loop) [ ] symmetrical [ ] recognisable shape [ ] compact [ ] 200mm tail (minimum)								
3.2 ABoK #409 (Double overhand noose) [ ] symmetrical [ ] recognisable shape [ ] compact [ ] 100mm tail (minimum)								

Mid line knot

3.3 ABoK #1053 (Butterfly knot) (this knot is sometimes integrated into a lanyard)								

…….

Optional knots: (teach & assess only after careful consideration of trainee needs)

End line knots

3.4 ABoK #1047 (Figure 8 loop – rethreaded)								
3.5 ABoK #1085 (Double figure 8 loop)								

Joining knots

3.6 ABoK #1415 (Double fishermans knot) (only taught if necessary to form prusik loop)								

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4.0 Harness

4.1 An appropriate harness is selected that is suitable for tower climbing [ ] work positioning type [ ] frontal attachment options [ ] side D rings for pole strap								
4.2 Harness is inspected for faults or damage [ ] normal wear & tear only [ ] no cracks, deformity or corrosion [ ] max 10 years age								
4.3 Harness meets relevant standards [ ] conforms to AS 1891.1 [ ] conforms to EN 358								
4.4 Fit & adjust harness in accordance with manufacturers instructions [ ] 4 fingers fit snugly under belts/straps [ ] correct fit for size of worker?								
4.5 Faulty harnesses are rejected and isolated from use [ ] 'out of service' tag is attached if necessary								

5.0 Climbing with a double hook lanyard (also known as a twin-tail lanyard)

5.1 Check and ensure lanyard is fit for use and meets relevant standards eg [ ] conforms to AS 1891.1 or EN 355 [ ] confirm if susceptible to short-circuiting [ ] last inspection within 6 months?								
5.2 Ensure lanyard has been inspected within past 6 months (refer AS 1891.4 clause 9.3.2)								
5.3 Maintain at least one point of contact with tower structure at all times while climbing/moving								
5.4 Avoid 'short circuiting' lanyards (refer AS 1891.4 clause 6.2.3 a iii) [ ] method of use cannot cause catastrophic failure of lanyard								
5.5 Lanyard is attached to appropriate hard point on harness [ ] frontal attachment is preferred [ ] avoid rear attachment – high risk								
5.6 Hooks are connected to tower structure in a way that ensures loading is within design limits [ ] no levering [ ] no cross-loading [ ] no back-hooking								
5.7 Lanyard is used in a way that does not create a trip or snag hazard while climbing [ ] lanyard is not too long causing entanglement or snagging								
5.8 Hooks are alternately attached to structure while climbing (leap frogged) [ ] distance climbed between successive hook placements does not result in potentially large free-fall								
5.9 Hook placements are made to solid structural steel on tower								

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6.0 Anchor systems (assessed over at least 3 occasions within a wider scenario context – eg embedded as part of a work procedure and a rescue procedure)

Note: Assessment is contextualised to suit the trainees workplace needs. Examples of situations requiring a solid anchorage include:

[ ] for rescue purposes

[ ] for hoisting tools and equipment to the work position

6.1 Establish an anchorage point [ ] solid (defined as 15kN for 1 person) [ ] reliable for the application [ ] structural steel is capable of supporting load								
6.2 Avoid sharp edges [ ] pad to insulate								
6.3 Use carabiners according to manufacturers instructions (correct use) [ ] cross-loading is avoided [ ] gates locked [ ] aligned properly [ ] levering is avoided								
6.4 Accurately position anchor [ ] enables task to be completed [ ] anchor position avoids pendulum effect [ ] anchorage is located in a suitable position to enable task to be completed								
6.5 Slings are used to establish solid anchor [ ] sharp edges are padded [ ] chokes are avoided (reduces strength) [ ] basket hitch is used (doubles sling strength)								

7.0 Ropes and rope handling skills

7.1 Inspect rope to ensure fitness for use [ ] no anomalies detected [ ] tactile (feel) technique while packing rope in rope bags								
7.2 House keeping is maintained [ ] ropes are stored in rope bags – rope pulled out as needed to avoid entanglements [ ] avoid standing on ropes								
7.3 Ropes are washed as deemed necessary [ ] manufacturers washing/cleaning recommendations are recited by students								
7.4 Ropes are fed into rope bags [ ] stack rope inside rope bag [ ] fix end of rope inside bag – stopper [ ] packing method enables rope end to be quickly located (eg end to be pre-tied and secured to outside of bag with carabiner)								

SKILL	Student 1	Student 2	Student 3	Student 4	Student 5	Student 6	Student 7	Student 8

8.0 Abseiling skills

Note – (Justification):
1. Abseiling is taught mainly so trainees have a means to rescue a patient. The patient is attached to the rescuers descending system and then evacuated to the ground. Transfer of the patient to the rescuer may involve either cutting or a counter-weight lifting procedure.
2. Abseiling may also be a viable technique to leave the work position from high on the tower – it is certainly a quicker and more efficient method of descending back to the ground.

8.1 Appropriate rope is selected and used [ ] Low stretch (static) kernmantel rope is used [ ] rope conforms to EN 1891 or AS 4142.3								
8.2 Rope diameter is suited to descending device [ ] rope diameter is confirmed as suitable for use with selected descending devices								
8.3 Deploy rope for descent [ ] rope bag thrown to ground (only if clear & direct descent path exists) [ ] safety warning call given								
8.4 Perform personal safety checks prior to initiating abseil descent [ ] 'ABCDE' check is carried out								
8.5 Configure and descend with an 'auto-locking' device (eg SRT No Worries, Petzl ID, VD100, etc)								
8.6 Maintain balance, speed control & situational awareness throughout the descent [ ] constant balance and control maintained								
8.7 Negotiate obstacles and/or uneven surfaces [ ] feet & hands are used to aid mobility [ ] no damage caused to any structure or fitting during descent								
8.8 Abseil with a rope bag attached to person [ ] rope deploys out of bag during descent								
8.9 spare								

SKILL	Student 1	Student 2	Student 3	Student 4	Student 5	Student 6	Student 7	Student 8

9.0 Rescue skills

Note: In some cases, a cutting procedure is acceptable for tower rescue training. With precautions and close supervision, the rescuer may elect to cut the patients lanyard or pole strap to transfer weight to the rescue line.

ASSESS SITUATION

9.1 Assess the nature of the emergency and respond appropriately – take charge if no one more experienced on site								

APPROACH

9.2 Access the patient from the ground by climbing the tower in the most time effective manner								
9.3 Upon reaching the patient, make an initial assessment and administer *basic life support* (airway takes priority)								

ANCHORAGE

9.4 Install and accurately position a solid & reliable anchor system to enable initial patient evacuation [ ] anchor must be above patient								

ABSEIL APPROACH + ACCOMPANIED DESCENT WITH PATIENT – USING MINI-HAULER (6:1) DEVICE

9.5 Approach patient via abseil descent [ ] maintain height advantage relative to patient [ ] attach rescue sling (max 300mm)								
9.6. Attach & operate min-haul device [ ] connect mini-hauler to appropriate position on patients harness [ ] rescue sling is confirmed and secure before attempting lift [ ] lift and transfer patient [ ] detach mini-hauler								
9.7 Ensure abseil device is capable of sustaining expected load/weight								
9.8 Carry out ABCDE check before committing to abseil descent								
9.9 Evacuate a person to safe ground using an assisted abseil procedure (using a shared descending device) [ ] use auto-locking device (eg Petzl ID) – must increase friction by deflecting through carabiner [ ] adequate friction must be achieved to cope with added weight of patient								
9.10 Shield victim from further injury or harm during abseil descent								
9.11 Maintain balance and speed control during assisted abseil descent [ ] avoid collisions with structure								

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CUTAWAY PROCEDURE (KNIFE)

9.12 Setup dummy pole strap for cutaway [ ] use lanyard as backup during cutaway								
9.13 Carry out ABCDE check before performing cut-away								
9.14 Avoid or reduce shock loading [ ] tension rescue sling between rescuer and patient [ ] take precautions to avoid shock loading								

LOWERING PROCEDURE (TEAM EXERCISE – requires at least 3 workers on site)

9.15 Setup ground anchor [ ] Sue auto-locking belay device [ ] Solid anchor point								
9.16. Install pulley above patient [ ] align pulley with respect to patient [ ] pendulum effect is avoided								
9.17 Evacuate a patient using a lowering system (preferred option where clear line-of-sight to ground exists or ground team available)								
9.18 Lowering speed and trajectory is controlled to avoid causing further trauma to patient								

POST RESCUE

9.19 Administer basic first aid to comfort and reassure the patient								
9.20 Avoid lying patient down if prolonged suspension in harness has occurred (ie suspension trauma)								
9.21 Document incident and follow up with debrief to supervisor [ ] Assessed as a discussion with trainee (trainee to verbally explain actions)								

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10.0 Ladder climbing skills (fixed ladders on comms towers)

Note: Not all towers are fitted with a fixed ladder system. Comms towers typically have a fixed ladder with cable fall-arrest system. Power transmission towers generally do not have a fixed ladder system.

10.1 Check ladder fall-arrest system is fit for use [ ] cable and anchorage is solid and reliable – test weight								
10.2 Ensure cable fall-arrest device is suited to particular cable diameter								
10.3 Carry out function test to ensure fall-arrester locks with sudden downward force								
10.4 Use a cable fall-arrest device to safeguard against a fall while climbing up and down a fixed ladder								
10.3 Use fall-arrester in accordance with manufacturers instructions (ensure fall-arrester attachment assembly is kept as short as possible)								
10.4 Transfer from fall-arrester to double lanyards and move away from ladder								
10.5 Transfer from lanyard back to cable fall-arrester on ladder (a point of contact must be maintained at all times)								
10.6 spare								

SKILL	Student 1	Student 2	Student 3	Student 4	Student 5	Student 6	Student 7	Student 8

11.0 Mechanical advantage skills (optional – assessed only where relevant to learners needs)

NOTE: Not all tower climbing courses will require mechanical advantage skills to be taught and assessed. Some tower climbers prefer to use a 'capstan' winch mounted on a 4WD. Assessment activities must be contextualised to suit the trainee's workplace needs. The type and amount of equipment resources used to build M.A. systems must be realistic and relevant. For example, some trainees may use an auto-locking device such as a Petzl ID (or Gri Gri) as their 'anti-return' device – thereby simplifying the whole process.

11.1 Install and accurately position a solid & reliable anchor system to enable the use of a hauling system								
11.2 Trajectory of hauling system is in alignment – sudden slippage or abrasion damage to ropes and equipment is prevented								
11.3 Use a simple hauling system to hoist a load (eg a 2:1 or 3:1 M.A.)								
11.4 Hoist load to target work position								
11.5 Install an progress capture device (PCD) to prevent haul load from backsliding during rest intervals – *anti-return must be simple & effective – eg Petzl ID or Gri Gri*								
11.6 Manage unused/slack rope to avoid entanglement and confusion while hauling – ie house keeping skills								
11.7 Amount & type of resources used to build the M.A. system are consistent with what the student would normally carry or have immediately available – *students must make a reasonable effort to be efficient in the amount of equipment they use*								
11.8 spare								

KEY ✓ = Competent NYC = Not Yet Competent NA = Not assessed
Note: This assessment instrument must be held on file for at least 30 years.

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