

Gliding Australia Training Manual

Trainer Guide



Unit 42

Daily Inspection, Pilot Maintenance Limits,
DI Certificate

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AIM

To develop the skills and knowledge required for assessment and examination by an authorised Daily Inspector (DI) Examiner:

- To perform a daily inspection on a glider;
- Including elements of pilot maintenance within approved limits, and;
- Correctly complete the DI Certificate.

PRE-REQUISITE UNITS

- GPC 25 Threat and Error Management;
- GPC 24 Human Factors and Pilot Limitations;
- GPC 3 Pre-flight Preparation

COMPLEMENTARY UNITS

Nil.

COMPETENCY ELEMENTS AND PERFORMANCE STANDARDS

ELEMENT	PERFORMANCE STANDARDS
1. Describe the key elements of the GFA Glider Airworthiness System.	<ul style="list-style-type: none"> • Describe: <ul style="list-style-type: none"> ○ the principle of Airworthiness. ○ the purpose of GFA Certificate of Registration. ○ the purpose of a Certificate of Airworthiness. ○ the purpose of a Sailplane Maintenance Release and Daily Inspection Record.
2. Conduct a Daily Inspection under supervision.	<ul style="list-style-type: none"> • Observe, Participate in, and conduct: <ul style="list-style-type: none"> ○ Daily Inspections under direct supervision of Instructors and DI Examiners. • Describe: <ul style="list-style-type: none"> ○ The implications of entries made, or missing, in the Sailplane Maintenance Release and Daily Inspection Record; ○ The airworthiness implications of defects, disconnections, obstructions, incorrect functionality, incorrect adjustments discovered during DIs that require judgement of potential non-airworthy conditions. ○ Appropriate actions that are undertaken to rectify discrepancies. • Conduct under supervision: <ul style="list-style-type: none"> ○ Allowed pilot maintenance actions on minor defects;

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	<ul style="list-style-type: none"> ○ Daily inspection certified in accordance with regulatory requirements.
3. Recognise non-airworthy conditions.	<ul style="list-style-type: none"> ● Recognise Non-airworthiness due to: <ul style="list-style-type: none"> ○ Missing or expired Sailplane Maintenance Release and Daily Inspection Record; ○ Outstanding Recurring Maintenance items (Due date or Time in service or Launches); ○ Outstanding non-cleared Major Defects; ○ Incorrect rigging of control connections, and failure to conduct and sign independent control checks after disconnection and reconnection; ○ Obstruction or incorrect functionality of primary and ancillary controls; ○ Physical or electrical defects or other incorrect functionality. ● Describe: <ul style="list-style-type: none"> ○ Airworthiness implications of outstanding non-cleared minor defects; ○ Actions to be taken upon recognition of non-airworthy conditions.
4. Recognise limits of allowed pilot maintenance.	<ul style="list-style-type: none"> ● Describe: <ul style="list-style-type: none"> ○ Maintenance actions that are permitted to be conducted by a glider pilot in command who does not hold glider maintenance qualifications; ○ Actions to be taken on identifying maintenance requirements and airworthiness limitations beyond PIC authorisation or ability; ○ Documents, references and authorised persons that may assist in conduct of allowed pilot maintenance.
5. Complete a Daily Inspector Examination.	<ul style="list-style-type: none"> ● Successfully complete: <ul style="list-style-type: none"> ○ A Daily Inspection Examination under the supervision of an authorised Daily Inspection Examiner.

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KEY MESSAGES

- Human factors matter. Self-discipline and avoidance of interruptions and distractions are critical to correct daily inspections. If interrupted, start again.
- Use the checklist in the Daily Inspection Schedule in the Maintenance Release.
- Know the glider. Check the type-specific manuals. Seek advice from others with experience of inspecting that glider type.
- Beware of airworthiness problems and risks associated with poor ground handling.
- Pilot safety depends upon Airmanship, Airworthiness discipline and Standards.
- Near enough is NOT good enough, she'll be right is NOT right. Cavalier attitudes towards airworthiness and maintenance may have serious safety consequences.
- A signed Daily Inspection by a qualified inspector certifying an airworthy glider is a prerequisite for flight. No exceptions.
- A signed Daily Inspection certifying an Independent Control Check after disconnection and reconnection of controls is mandatory. No exceptions.
- Look at the glider from a distance first, and flight control functionality, checking major airworthiness defects before examining the detail.

LESSON PLANNING AND CONDUCT

- This unit must be performed in conjunction with an authorised Daily Inspection (DI) Examiner. Only an authorised DI Examiner can sign a student pilot off as qualified for award of a DI Rating.
- Instructors who are not authorised DI examiners, yet who hold DI ratings, are expected to conduct training for this unit through student observation and supervision with DIs conducted by the instructor.
- When the student has been trained in these DI foundation competencies, they must be handed over to an authorised DI Examiner for training, examination and approval of a DI Rating.
- The instructor is expected to be capable of training a student to a standard suitable for assessment and examination by an authorised DI Examiner.

Daily Inspection Lesson Planning

- A structured approach to DI lesson planning is far preferable to ad-hoc training during preparations for flying operations. The latter training may be "loose" and lead to training and education gaps, and of most concern, poor primacy and habits.
- The Club Training Panel and Club Maintenance Officer must have clear policies and protocols for integrating the operationally-focused daily inspection training provided by instructors with that provided by authorised daily inspection examiners.

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The DI training system in clubs should be structured to utilise:

- Disciplined observation of instructors conducting daily inspections during preparations for flying operations.
- Student participation in conducting daily inspections, under supervision of the instructor actually conducting and signing the daily inspection.
- Student self-study of the GFA Daily Inspectors Handbook.
- 'Ground school' sessions on airworthiness documents and references, glider type-specific handbooks and schedules, daily inspections, rigging and control connections, common defects and errors, relevant accidents and occurrences.
- 'Ground school' sessions on human errors and biases, human factors, threat and error management, in the context of both daily inspection and pilot maintenance.
- Supervised participation in pilot maintenance, defect repairs, annual inspections, glider de-rigging and rigging evolutions and post-rigging checks.
- Airworthiness education, training and examination by an authorised Daily Inspection Examiner.
- Ongoing mentoring and education of pilots in airworthiness issues and occurrences.

Pilot Maintenance Training

- It is essential that solo pilots and Daily Inspectors understand the limits of allowed pilot maintenance. These are defined in the DI Handbook (and MoSP Part 3 Airworthiness and CASA regulations).
- Daily Inspectors may carry out and certify the following maintenance:
 - Inflate tyres (under inflation must be rectified before flight);
 - Change main wheels, tyres, tubes and brake shoe plates by exchange with serviceable item(s) or replacement of parts, including fitting axle nut split pins & brake shoe bolt lock-wiring (in the case of a hydraulic disc brake slave cylinder) under supervision from a Form 2 inspector.
 - Adjust cable actuated wheel brakes for better braking;
 - Change nose- and tail-wheels, tyres and tubes;
 - Secure removable ballast;
 - Clean out the fuselage and other components;
 - Replace simple gap tape – fixed surface to fixed surface, e.g. fuselage to wing junction;
 - Polish canopies using appropriate materials and processes;
 - Remove or replace instruments (other than the ASI and altimeter) where this does not affect the pitot-static system, e.g. TE driven variometer; g meter, navigation display;
 - Install and remove/replace batteries;

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- Perform Independent Daily Inspections after re-rigging gliders;
- Lubrication as appropriate;
- Change or amend placards under instruction
- Change worn skid shoes and plates.
- It is self-evident that students must be supervised in carrying out these activities, by instructors, airworthiness officers and Form 2 inspectors as appropriate, until they are deemed competent in these tasks and hold a Daily Inspection rating.
- The principle here is: If you are not sure what you are doing, then do not undertake the matter on your own. Rather take the initiative and find competent assistance so that you have appropriate supervision while conducting the task, or that the other person carries out the task while you observe, assist them and learn from them.

INSTRUCTOR NOTES

The DI instructor (Form 2 Inspector or DI Trainer) and DI examiner must insist on very high standards of self-discipline and attention to detail. Pilots' lives depend upon discovery of non-airworthy conditions and successful completion of daily inspections.

- Avoid distractions and interruptions. If interrupted, start again.
- Insist that students download, print and study the Daily Inspectors Handbook.
- Place high emphasis on primacy, and recognition of key non-airworthy conditions including incorrect rigging, non-connection of controls, incorrect functionality of primary and ancillary controls, obstructions, adjustment of seats and harnesses, cable releases, glider-specific common defects.
- Always use the Daily Inspection Schedule checklist in the Sailplane Maintenance Release
- When minor defects are discovered, always ask the student whether these are within scope of allowed pilot maintenance, or whether they require an authorised maintenance officer to remedy and sign defect clearance.
- A required training outcome is that pilots and daily inspectors understand the limitations of allowed pilot maintenance. It is highly desirable that they should be able to conduct some of these tasks. Further airworthiness training in particular tasks may be required.
- It is a good idea to get the student to self-analyse and debrief their performance of supervised daily inspections and pilot-allowed maintenance, and airworthiness insights arising from those activities.
- Beware of over-confidence, poor self-discipline, cavalier or dismissive attitudes. Pilots may benefit from sobering education using SOAR Occurrence Reports, Accident Summaries and Airworthiness Notices.
- Educate students that the GFA Maintenance Department is particularly concerned about the continuing high rate of preventable accidents, injuries and defects arising from:
 - Incorrect glider rigging and disconnected controls;
 - Jamming, obstruction, incorrect adjustment and obvious damage to controls;
 - Incorrect adjustment and rigging of seats and harnesses;
 - Incomplete and interrupted daily inspections and pre-flight checks;
 - Incorrect and unauthorised pilot maintenance;
 - Ground handling errors affecting airworthiness.

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THREAT AND ERROR MANAGEMENT

- Human Error may drive many non-airworthy conditions, including:
 - Flight with disconnected, obstructed or incorrectly adjusted controls;
 - Flight with mis-rigged pins and safety devices;
 - Flight with major defects not cleared;
 - Flight with Daily Inspection not completed and signed;
 - Flight with electrical, avionics, fuel, engine management and ancillary systems not correctly configured or functional.
- Stay alert. Always adopt a defensive mental posture, assuming possible defects until checked correct. Do not assume; check.
- Avoid distractions and interruptions. If interrupted, start again.
- Pilots may rush inspections and checks may be less thorough. They may also be inclined to downplay the significance of a minor defect. Self-discipline is critical to safety outcomes.
- Independent Control Checks are essential after disconnection and reconnection of controls.
- If in any doubt, a second pair of eyes may assist in reducing airworthiness risks and checking any pilot maintenance prior to flight.
- Dehydration, fatigue, overheating, cold or discomfort may contribute to lapses and errors in inspections and pilot maintenance. Inaccessibility and poor visibility may drive inspection and maintenance errors. Using the wrong tools may cause errors and defects.

TRAINING MATERIALS AND REFERENCES

- GFA Daily Inspectors Handbook.
- TEM (Daily Inspections).pptx
- GFA MoSP Part 3 Airworthiness.
- GFA Basic Sailplane Engineering.
- GFA Form 1 Sailplane Maintenance Release and Daily Inspection.
- Pilot Operations Handbooks, Glider Flight Manuals, Glider Maintenance Manuals, Glider Type Sheets, Technical Notices and Airworthiness Directives (Type-specific.)
- GFA SOAR Reports and Occurrence Summaries.

TRAINING NOTES AND LESSON PLANNING FOR POWERED SAILPLANE PILOTS

- During conversion training to powered sailplane, much emphasis is placed upon the operational and handling aspects of powered sailplanes. Equal emphasis must also be placed upon the ground handling, daily inspection and airworthiness aspects of these powered

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sailplanes, to ensure that airworthiness issues do not become safety and operations occurrences.

- Daily Inspection training for pilots of powered sailplanes and touring motor-gliders introduces higher systems complexities and risks, compared with non-powered sailplanes described above. These include:
 - Power plant;
 - Internal combustion engine;
 - Jet engine;
 - Electric drive;
 - Fuel system;
 - Battery system;
 - Engine management systems;
 - Electrical system;
 - Avionics;
 - Glider pilot and fuel loading and ballasting.
- Daily Inspection training must therefore include study of glider type-specific handbooks and references, and systems handbooks as necessary.
- It must be emphasised that correct conduct of ground tests of engines and powered sailplane systems is no guarantee that they will actually operate correctly in flight.
- DI training must therefore emphasise key checks and recognition of non-airworthy conditions. Examples include fuel system airlocks and leaks; fuel valves; voltage checks; interlocks for engine or propeller operation and retraction; EMS and sensor functionality checks.
- Study of maintenance problems, airworthiness and operations occurrence reports is highly recommended.
- Study of propulsion system human factors issues is also highly recommended. Higher systems complexity is a risk driver for human factors occurrences.
- Note also that prior powered flying experience should bring advantages of engine management and airworthiness experience and knowledge, BUT also might bring unrealistic expectations of higher reliability and obvious inspection issues. Powered sailplane powerplants are demonstrably less reliable than those used in general aviation.