

Hawker Siddeley Harrier T4/T4A/T4N Rigging Position Procedures

Group D1 –

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Introduction

This document outlines the relevant safety considerations, procedures to be followed, cost breakdown and man-hour requirements for lowering and raising a Hawker Siddeley Harrier T4/T4A/T4N for rigging checks. The information outlined herein has been produced in part using the relevant Ministry of Defence Air Publication (AP). Although all due consideration has been used in the production of this document where any ambiguity remains or conflicting information resides the AP is to be taken as the authoritative source.

Risk Management

Control of Substances Hazardous to Health

	Trade Name:	Aeroshell fluid 41	Issue No	
	Product:	Om15 mil-prf-5606h	MAFF	
	Supplier:	Shell New Zealand limited	No	
	Application:	Hydraulic Fluid	HSE No	
	1. HAZARDS			
Not classified as hazardous according to HSNO regulations 2001 [2]				
2. FIRE HAZARD		3. EXTINGUISHING AGENT		
Not classified as flammable but will burn		foam and dry chemical powder, carbon dioxide, sand or earth can be used for small fires only.		
4. FACILITIES REQUIRED FOR USE		5. PROTECTIVE CLOTHING		
Well ventilated room to remove vapours, mists or aerosols.		Safety glasses, PVC or rubber gloves and overalls.		
6. GENERAL ADVICE FOR USE		7. STORAGE & TRANSPORT		
The substance is not hazardous under normal use conditions, although prolonged exposure to the oil can lead to dermatitis.		Store in a cool, dry, well-ventilated place, use properly labelled secure containers, avoid direct sunlight and strong oxidising agents. Not dangerous to transport.		
		8. SPILLAGE PROCEDURE		
		For small spillages use dust or earth to absorb the liquid and dispose of in clearly marked containers. For large spillages do the same but make an effort to reclaim any re-usable fluid.		
9. DISPOSAL				
Recycle or dispose of this substance in accordance with the ongoing regulations regarding the recycling and disposal of substances. Alternatively hire contractors to ensure the disposal of this material, however correct procedures must be clearly established with the contractor				
10. FIRST AID ACTION				
This substance is unlikely to give rise to an acute hazard under normal conditions of use. If the substance is inhaled remove the affected party to a fresh air environment however it is unlikely that symptoms will arise. If symptoms do occur and persist seek medical attention. In the event of skin contact wash affected area with soap and water [2]. If ocular exposure occurs				

then immediately flush eye with copious quantities of water. If it is ingested wash mouth out with soap and then ensure medical attention is sought after. If any discomfort is persistent as a result of contact with this substance then seek medical advice.

11. COSHH ASSESSMENT – SEE OVERLEAF

This information was prepared to ensure your safety when using the above product.

Signed Callum Nicholson _____ Position

Dept/School Coventry University _____

Date _____

For further information or advice, telephone the Safety Office on ext. 7341

C.O.S.H.H. PRECAUTION SHEET

CONTROL OF SUBSTANCES HAZARDOUS TO HEALTH REGULATIONS 2002 (COSHH)

The COSHH Regulations introduced a new legal framework for the control of substances hazardous to health and the protection of people who use them at work. Employers are legally required to assess the risks created by a substance in use and inform all users accordingly.

THIS FORM IS DESIGNED FOR THIS PURPOSE AND MUST BE ISSUED OR MADE AVAILABLE TO ALL USERS. PRODUCT USE ASSESSMENT TO BE COMPLETED BY SUPERVISOR

This assessment is for:
PRODUCT TRADE NAME:

Aero shell fluid 41

USED AT ESTABLISHMENT -

Coventry University

LOCATION -

EC LAB

QUANTITY USED PER APPLICATION -

N/A

FREQUENCY OF USE -

What is form of product (solid, liquid, gel etc)?

Liquid

Does the product require diluting prior to use, if so, what is the dilution rate?

Yes /No

No

Are you aware of any substances given off during the use of this product (fume, odour, dust etc)? GIVE DETAILS

Yes /No

No

Do any operators suffer any ill effects from the product (sore throats, irritation etc)? GIVE DETAILS	Yes /No	No
Does the process create any waste material or by product? If yes explain -	Yes /No	No
Are you satisfied that sections 4, 5, 6, 7 and 9 overleaf are complied with? If not, explain why -	Yes /No	Yes
Are any control measures used to prevent exposure of employees to hazardous substances e.g. exhaust, enclosures, respiratory protective equipment? Please identify -	Yes /No	Sealed inside of a controlled space for Hydraulic use
How often are the controls examined and tested?		
Does any monitoring for airborne concentration take place? If yes, by whom?	Yes /No	No
Do you have any comments?		
Assessment undertaken by:- Name <u>Callum Nicholson, Javier Gordon</u> Position _____		
Dept/School _____ Date _____		
MEDICAL SURVEILLANCE		
If medical surveillance is required (see overleaf) employer must contact the Safety Office BEFORE using the product.		

Assessors Name:	Mohammed Thofeq Miah	Department	Maintenance Department
Assessment Date:		Task:	Jacking and rigging

Purpose/Method of Work	
<ul style="list-style-type: none"> • Check to ensure ground is an even levelled surface • Ensure that the aircraft is secure on jacks with the wheels in contact with the ground • Earth the aircraft • Remove all tools and loose equipment from the ground • Check equipment is serviceable and assembled correctly • Check wind speed ensuring it does not exceed 50 knots from any directions. If there is wind, then ensure the aircraft hood is sealed and rudder bar is locked. • Dump fuel 	
Persons affected	Level of Skill/Training Required
<ul style="list-style-type: none"> • Staff (B1 Engineer, B2 Engineer, 4 x Cat A Engineer) • Visitors 	Training for manual handling is required for this. All staff should be licenced: B1, B2 and Cat A

Potential Hazard	Who is at risk?	Risks	Impact Rating (Low, Med, High)	Preventative Measure	Reassess Impact rating	Likelihood of occurring
Manual Handling	<ul style="list-style-type: none"> Staff 	<p>Persons may suffer injuries in various parts of the body in response to carrying out certain movements such as lifting.</p> <p>This may lead to back pain and upper body disorder, this may be due to:</p> <ul style="list-style-type: none"> Incorrect form when carrying out tasks Overloading workloads Poor working environment layout Persons with health conditions and injuries, as well as expecting mother have a higher risk of the potential hazard 	Medium	<p>All staff are required to carry out manual handling training which involves correct techniques and posture, and loading.</p> <p>Further preventative measures include</p> <ul style="list-style-type: none"> Open working environment to allow free movement Health checks Movement of heavy objects should be done using the required mechanical tools such as cranes and trollies. 	Low	Not frequent
Slips, Trips, Fall	<ul style="list-style-type: none"> Staff Visitors 	<p>Persons may suffer injury because of the potential hazard. The hazard may occur due to:</p> <ul style="list-style-type: none"> Wet/slippery floor Unclear environment Obstructions or tools Uneven floor Poor working environment structure 	High	<p>The environment should remain clear of obstructions always and any spills should be reported and cleared as soon as possible before resuming any further work.</p> <p>The ground will be checked prior to task to ensure it remains level to prevent any trips.</p> <p>Further changes made:</p> <ul style="list-style-type: none"> All tools shall be returned once used Working environment should be maintained and cleaned through the day 	Medium	Daily however with precautions in place, the risk will not be frequent
Working Environment (temperature)	<ul style="list-style-type: none"> Staff 	<p>Working environment may impact persons physically and psychologically as well as impact heavily on performance</p> <ul style="list-style-type: none"> High temperature may lead to head aches, measure, poor grip due to moisture. <p>Psychologically, hot environments may also</p>	High	<p>The risks will be prevented by:</p> <ul style="list-style-type: none"> Using optimum room temperature with adequate ventilation to maintain the optimum temperature Further items/clothing will be provided to prevent individual 	Low	Never

		<p>cause tiredness thus reducing activity concentration</p> <ul style="list-style-type: none"> • Cold temperature may lead to a reduces strength in grip or working with small parts. This environment will also lead to headaches thus leading to poor concentration which could result in further accidents 		<p>persons from working in an extreme environment</p> <ul style="list-style-type: none"> • In an uncontrollable environment such as working outdoors, regular breaks and fluid will be given. 		
Working Environment (Lighting)	<ul style="list-style-type: none"> • Staff 	<p>Working environment which is poorly lit may lead to accidents due to placements of equipment. This produces a high risk of physical injury.</p> <ul style="list-style-type: none"> • The impact of poor lighting may also lead to tiredness; this will also increase the chance of trips and slips causing injury • The impact of excessive lighting will also be a source of distraction therefore being a cause for injury through distraction. 	Low	<p>The risk will be prevented by:</p> <ul style="list-style-type: none"> • Using adequate lighting in the workspace by spacing out each light • Ensure adequate amounts of natural light is in the workspace environment through windows. • For jobs requiring more lighting, provide torches and head helmets. This will prevent changes in lighting affecting others. 	None	Never
Mechanical Lifting	<ul style="list-style-type: none"> • Staff 	<p>Inability to use mechanical lifting tools properly may lead to catastrophic injury or death.</p> <ul style="list-style-type: none"> • The impact of using mechanical tools without guidance may lead to serious physically injury. 	Medium	<p>The risks will be prevented by:</p> <ul style="list-style-type: none"> • Provide correct manual handing training on using the mechanical lifting tools. • Ensure staff are aware and know the risk assessment attached to the mechanical lifting tools, and how to minimize the injury • Provide safety tools such as steel toe boots and hard hats to prevent the impact if any risks do occur 	Low	Rarely
Hand tools	<ul style="list-style-type: none"> • Staff 	<p>The misuse of hand tools may also lead to injury if not used correctly. As hand tools come in different</p>	Medium	<p>The risks of hand tools injury can be prevented by:</p>	Low	Rarely

		shapes and size and sharpness, the chances of risk changes. Misusing any tool attaches itself to physical injury on various parts of the body as well as injury to others.		<ul style="list-style-type: none"> • Provide training on hand tools and the risk assessment attached to it • Provide safety equipment such as gloves when using certain equipment • Ensure adequate lighting is in workspace to allow workers to work correctly with hand tools. 		
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Types of impact rating:

- **Low:**
The low impact risk does not lead to physical injury however may slow down working and lead to a decrease in productivity. Furthermore, low risk injury can easily be managed and prevented
- **Medium:**
Medium impact risk may cause minor to serious damage to injury as well as have a physiological impact. Medium risks will cause a definite reduction in productivity following by high costs in damage
- **High:**
High impact risk will cause catastrophic harm and may lead to human death. This risk will have an impact on the running of business as well as physiological impact on others. High impact risks may also lead to high costs and decrease in business performance.

Impact / Frequency	Low	Medium	High
Daily	Yellow	Red	Red
Frequent/ Occasionally	Green	Yellow	Red
Rarely/ Never	Green	Green	Yellow

SMP(RCP0001): Aircraft Jacking – Rigging Position				SCHEDULED MAINTENANCE PROCEDURE Aircraft/Equipment: H-S Harrier T4/T4A Ser No: XW270 C/N:212009 Date: 01/03/2018					
SAFETY AND MAINTENANCE NOTES ARE TO BE COMPLIED WITH THROUGHOUT THE WORK DETAILED IN THIS PROCEDURE				Tradesman Man Hrs	Tradesman Initials & TDM	Brief details of suspected defect and MWO ORN where applicable	Supervisor Man Hrs	Supervisor Initials & TDM	
STRUCTURAL INTEGRITY OPERATIONS ARE MARKED WITH A 'Y' AND ARE TO BE UNDERTAKEN BY AN AIRCRAFT TECHNICIAN (MECHANICAL)									
TRADE	MAN HOURS	ASSOCIATED PROCEDURES	TIME		Tradesman Man Hrs	Tradesman Initials & TDM	Brief details of suspected defect and MWO ORN where applicable	Supervisor Man Hrs	Supervisor Initials & TDM
ATM & ATE	7.0	AP 101B-0604-1A Chap. 7-00: 6A, 11A, 13-15, 32 AP 101B-0604-1A Chap. 7-10 AP 101B-0604-1A Chap. 7-20 AP 101B-0604-1E Chap. 56-40: 3.11-3.14	ELAPSED	MAN HOURS					
SPECIALIST TOOLS AND EQUIPMENT: <ul style="list-style-type: none"> • Levelling Bars (1 & 2) • Undercarriage Ground Locks • Airbrake Safety Key • Jacking Beam Trestles (Fore & Aft) • Tie Bars • Jacks (Fore & Aft) • Clinometer 									
WARNING... ANTI-COLLISION LIGHT CAPACITOR VOLTAGES ARE LETHAL THEREFORE ENSURE THAT CAPACITORS HAVE BEEN LEFT FOR A MINIMUM OF 10 MINUTES TO DISCHARGE AFTER FUSE REMOVAL BEFORE REMOVING THE LIGHT UNIT. JACKS POSITIONED INCORRECTLY AND THOSE WHICH ARE RAISED UNEVENLY IN LARGE INCREMENTS ARE LIKELY TO RESULT IN THE AIRFRAME TIPPING. LEVELLING BAR CLINOMETER INSPECTION SHOULD BE UNDERTAKEN WITH JACKS LOCKED.									

SMP(RCP0001): Aircraft Jacking – Rigging Position (Continued)

SCHEDULED MAINTENANCE PROCEDURE
 Aircraft/Equipment: H-S Harrier T4/T4A
 Ser No: XW270 C/N:212009
 Date: 01/03/2018

SAFETY AND MAINTENANCE NOTES ARE TO BE COMPLIED WITH THROUGHOUT THE WORK DETAILED IN THIS PROCEDURE

STRUCTURAL INTEGRITY OPERATIONS ARE MARKED WITH A 'Y' AND ARE TO BE UNDERTAKEN BY AN AIRCRAFT TECHNICIAN (MECHANICAL)

Tradesman Man Hrs	Tradesman Initials & TDM	Brief details of suspected defect and MWO ORN where applicable	Supervisor Man Hrs	Supervisor Initials & TDM
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ELECTRICAL

1. Preparation

1.1 Aircraft

1. Assess ground level and suitability, tow to level ground where possible. When satisfied;
2. Ensure electrically safe.

1.2 Fuses

1. Remove Fuse 182.
2. Remove Fuse 105.
3. Remove Fuse 111.

See Warning: Discharge capacitor before continuing.

1.3 Lower Anti-Collision Strobe Light

1. Remove. (Chap. 56-40)

AIRFRAME

2. Preparation

2.1 Local Area

1. Clear area of non-essential equipment and personnel.
2. If appropriate place a cordon around the aircraft.

2.2 Beam Trestle, Frame 33

1. Position approximately beneath the TRESTLE HERE marks, tie bar attachments facing forward.

2.3 Jacks, Frame 33

1. Position to support each end of the beam trestle, with adjustable legs facing fore and aft (Figure 1).
1. Adjust equipment until locating spigots on former

2.4 Equipment, Frame 33	align with the centre of holes in fuselage skin. Do not fit spigots.				
2.5 Jacks, Frame 33	<ol style="list-style-type: none"> 1. Ensure beam trestle is firmly in contact with fuselage skin. 2. Ensure jack bodies are vertical. 3. Ensure adjustable legs remain positioned fore and aft (Figure 1). 4. Ensure adjustable legs are firmly grounded and locked tight with equal load on all legs. 				
2.6 Locating Spigots	<ol style="list-style-type: none"> 1. Fit. 2. Secure with locking pins. 				
2.7 Beam Trestle, Frame 12	<ol style="list-style-type: none"> 1. Position approximately beneath the TRESTLE HERE marks, tie bar attachments facing aft. 				
2.8 Jacks, Frame 12	<ol style="list-style-type: none"> 1. Position to support each end of the beam trestle, with adjustable legs facing fore and aft (Figure 1). 				
2.9 Tie Bars (1 pair port and stbd).	<ol style="list-style-type: none"> 1. Attach to Frame 33 beam trestle. 				
2.10 Equipment, Frame 12	<ol style="list-style-type: none"> 1. Adjust equipment until tie bars can be attached. 2. Attach tie bars. 				
2.11 Jacks, Frame 12	<ol style="list-style-type: none"> 1. Ensure beam trestle is firmly in contact with fuselage skin. 2. Ensure jack bodies are vertical. 3. Ensure adjustable legs remain positioned fore and aft (Figure 1). 4. Ensure adjustable legs are firmly grounded and locked tight with equal load on all legs. 				
2.12 Equipment, Frames 12 & 33	<ol style="list-style-type: none"> 1. Check for equal airframe level all round, adjust jacks as necessary before proceeding. 				
	<ol style="list-style-type: none"> 1. Ensure clear of obstructions prior to lifting. 				

<p><u>AIRFRAME</u></p> <p>3. <u>Lifting</u></p> <p>3.1 Jacks, Frames 12 & 33</p> <p>3.2 Lifting</p> <p>3.3 Bonding Lead</p> <p>4. <u>Preparation for Levelling</u></p> <p>4.1 Main Undercarriage Ground Lock</p> <p>4.2 Airbrake Shut-off Valve</p> <p>4.3 Nose Undercarriage</p> <p>4.4 Outrigger Undercarriage</p>	<p>See Warning: Ensure jacks are loaded evenly and the airframe is not raised unevenly to prevent tipping and remove all non-essential personnel.</p> <p>1. Ensure clear of obstructions prior to lifting.</p> <p>2. Loosen fore and aft adjustable legs.</p> <p>3. Ensure fore and aft legs are maintained in an unloaded condition throughout lifting by lifting on the side of the undesired load e.g. rear leg loaded, lift at Frame 33.</p> <p>1. Operate front and rear pairs of jacks alternately until aircraft wheels are clear of the ground.</p> <p>2. When aircraft is level by eye tighten adjustable legs to obtain equal load on all legs.</p> <p>1. Bond aircraft to an approved earthing point.</p> <p>1. Ensure fitted.</p> <p>1. Close, using air brake safety key.</p> <p>1. Ensure fitted.</p> <p>1. Ensure fitted.</p>					
<p><u>AIRFRAME</u></p> <p>5. <u>Levelling</u></p> <p>5.1 Transverse Level</p> <p>5.2 Jacks, Frame 33</p> <p>5.3 Jacks, Frame 12</p>	<p>1. Place levelling bars on levelling brackets (Figure 2).</p> <p>2. By use of a clinometer check transverse level.</p> <p>3. Adjust if necessary by raising both jacks on lower side.</p> <p>1. Loosen fore and aft adjustable legs.</p> <p>2. Ensure fore and aft legs are maintained in an unloaded condition throughout the levelling procedure.</p> <p>1. Slowly lower to minimum lift position.</p>					

<p>5.4 Jacks, Frame 33</p>	<ol style="list-style-type: none"> 1. Raise Frame 33 until required aircraft attitude is attained. Rigging position – zero degrees. Engine change – 1.5 degrees nose down. 2. Check transverse level. 3. Tighten adjustable legs to obtain equal load. 					
<p><u>ELECTRICAL</u></p>						
<p>ONLY APPLICABLE IF CORRESPONDING FUSES HAVE BEEN REMOVED</p>						
<p>6. <u>General</u></p>						
<p>6.1 Fuses</p> <ol style="list-style-type: none"> 1. Fit fuse 18. 2. Fit fuse 303. 3. Fit fuse 19. 4. Fit fuse 472. 5. Fit fuse 481. 6. Fit fuse 561. 						
<p><u>AIRFRAME</u></p>						
<p>7. <u>Lowering</u></p>						
<p>7.1 Bonding Lead</p> <ol style="list-style-type: none"> 1. Remove from aircraft and approved earth/bonding point. 						
<p>7.2 Air Brake Shut-Off Valve</p> <ol style="list-style-type: none"> 1. Open and remove air brake safety key. 						
<p>7.3 Local Area</p> <ol style="list-style-type: none"> 1. Ensure aircraft and local area is clear of any obstructions. 						
<p>7.4 Jacks, Frames 33</p> <ol style="list-style-type: none"> 1. Loosen fore and aft adjustable legs. 2. Ensure fore and aft legs are maintained in an unloaded condition during lowering. 						
<p>7.5 Lower</p> <ol style="list-style-type: none"> 1. Slowly lower the front pair and rear pair of jacks alternately until all wheels are firmly on the ground. Do not completely remove weight from jacks. 						
<p>7.6 Spigots</p> <ol style="list-style-type: none"> 1. Locate spigots. 2. Remove locking pins. 3. Remove spigots. 						

<p>7.7 Lowering</p> <p>7.8 Local Area</p>	<p>1. Lower jacks until beam supports are clear of aircraft.</p> <p>1. Remove jacking equipment from the vicinity of the aircraft.</p>					
<p><u>ELECTRICAL</u></p> <p>2. <u>General</u></p> <p>8.1 Fuses</p> <p>8.2 Lower Strobe Light</p>						
	<p>1. Fit fuse 182.</p> <p>2. Fit fuse 105.</p> <p>3. Fit fuse 111.</p> <p>1. Fit (Chapter 56-40).</p>					

FIGURE 1:



CORRECT



INCORRECT

Jacks should be positioned with feet parallel and perpendicular to the aircraft longitudinal axis.

FIGURE 2:



Levelling brackets as found on the rear and forward port frame faces respectively.

Support Equipment Requiring Fabrication

Levelling bars for clinometer placement require fabrication for which technical drawings have been produced as below.

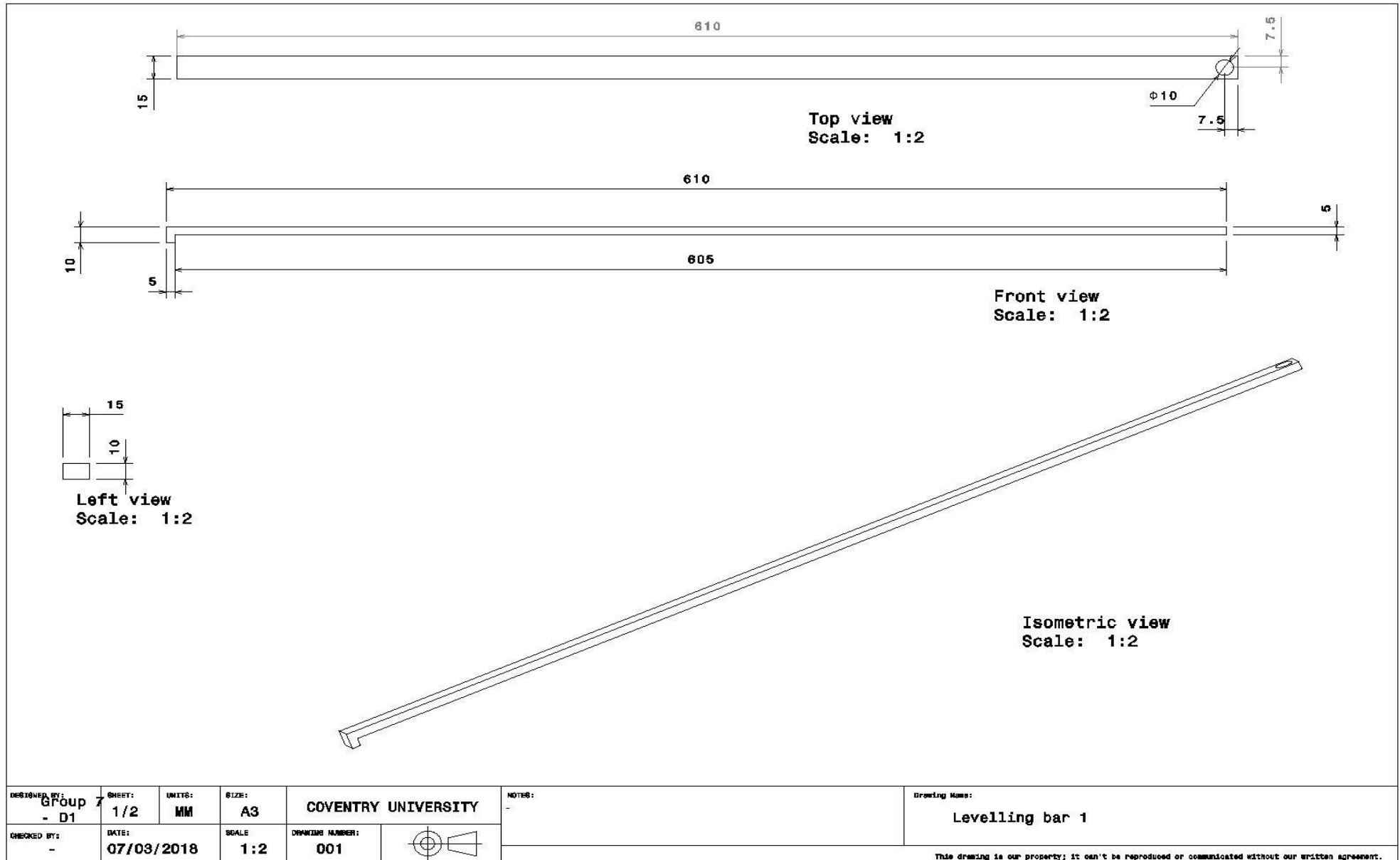


Figure 1. Technical Drawing of Levelling Bar 1

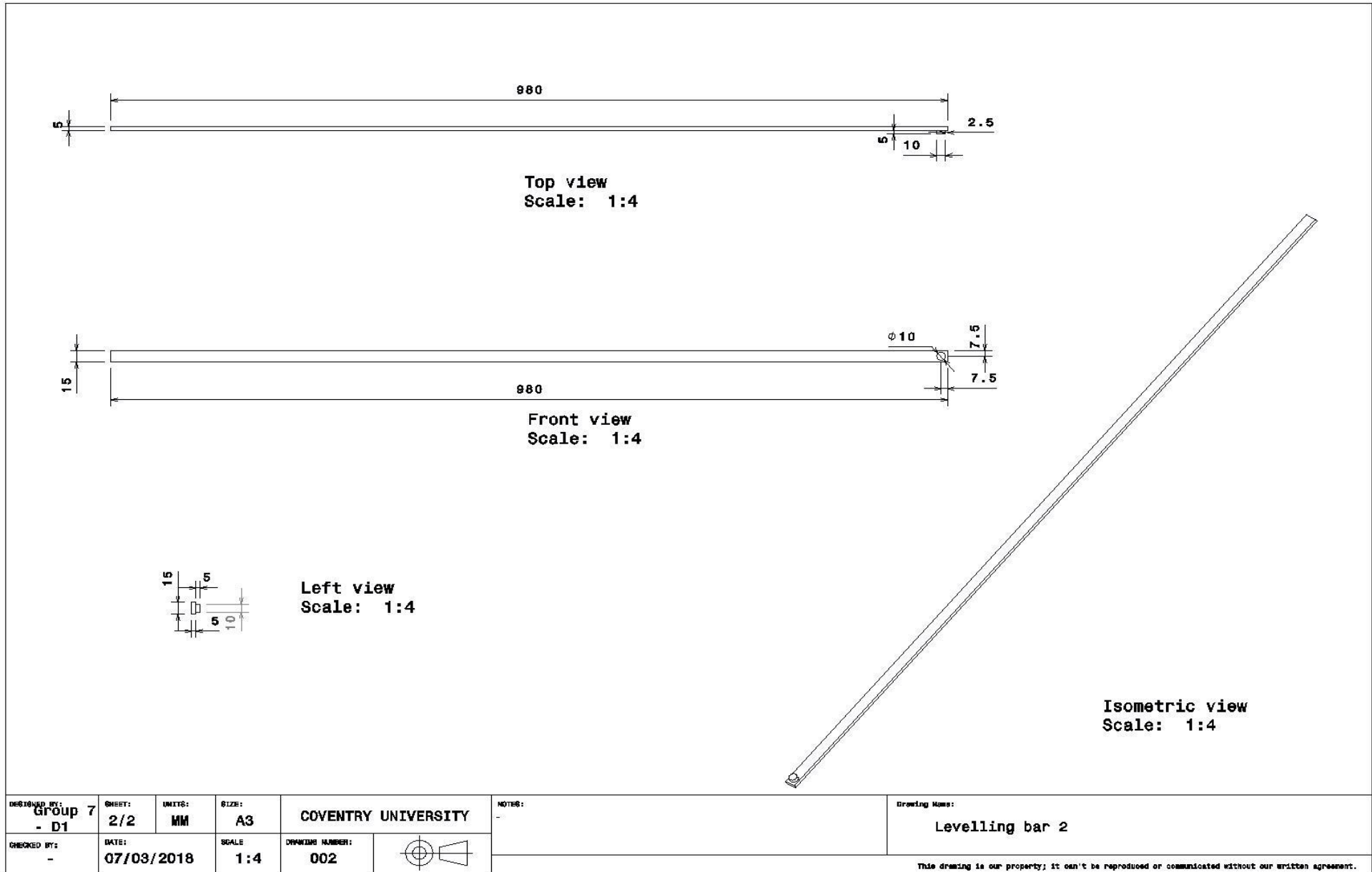


Figure 2. Technical Drawing of Levelling Bar 2



Figure 3. CATIA Illustration of Levelling Bar Assembly

Costing implications

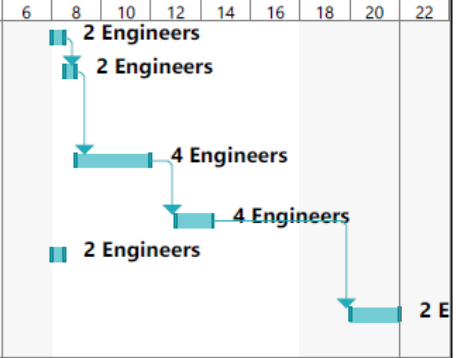
Levelling Bars	up to manufacturer
Jacks	ca. £7000 each
Clinometer	£145
B1 Engineer	average £28 ph.
B2 Engineer	average £28 ph.
Cat. A Engineer	average £18 ph.

- Towing 0.5 hrs – 2 Engineers, 1 Supervisor (£32)
- Electrical and Airframe Preparation 0.5 hrs – 2 Engineer, 2 Supervisor (£49)
- Aircraft lifting and levelling 3 hrs – 4 Engineers, 2 Supervisors (£384)
- Airframe lowering 1.5 hrs – 4 Engineers, 2 Supervisors (£192)
- Optional electrical configuration 0.5 hrs – 2 Engineers, 2 Supervisors (£46)
- Electrical reconfiguration 0.5 hrs – 2 Engineer, 1 Supervisor (£32)

If the whole operation will be carried out according to time planning on Gantt's chart, the cost for staff will equal to £735.

Timescales Gantt Chart

ID	Task Mode	Task Name	Duration	Start	Finish	Predecessors	Number of engineers	Supervisors										
1	★	Towing	0.5 hrs	Fri 27/04/18	Fri 27/04/18		2 Engineers	1	4	6	8	10	12	14	16	18	20	22
2	★	Electrical and Airframe Preparation	0.5 hrs	Fri 27/04/18	Fri 27/04/18	1	2 Engineers	1										
3	★	Aircraft lifting and levelling	3 hrs	Fri 27/04/18	Fri 27/04/18	2	4 Engineers	2										
4	★	Airframe lowering	1.5 hrs	Fri 27/04/18	Fri 27/04/18	3	4 Engineers	2										
5	★	Optional electrical configuratin	0.5 hrs	Fri 27/04/18	Fri 27/04/18		2 Engineers	2										
6	★	Electrical reconfiguration	0.5 hrs	Fri 27/04/18	Fri 27/04/18	4	2 Engineers	1										



Project: Harrier maintenance ga
Date: Mon 23/04/18

Task		Inactive Summary		External Tasks	
Split		Manual Task		External Milestone	
Milestone		Duration-only		Deadline	
Summary		Manual Summary Rollup		Progress	
Project Summary		Manual Summary		Manual Progress	
Inactive Task		Start-only			
Inactive Milestone		Finish-only			

Supervision

For ensuring all health and safety aspects of the operation are maintained SMS must be implemented and followed (Safety Management System). SMS is in words of CAA: “proactive and integrated approach to managing safety including the necessary organisational structures, accountabilities, policies and procedures.” (2014) and states the company requirements for safety.

Manager that will oversee work and be responsible for SMS should have:

- a) Corporate authority for ensuring all activities can be financed and carried out to the required standard;
- b) Full authority for ensuring adequate staffing levels;
- c) Direct responsibility for the conduct of the organisation's affairs;
- d) Final authority over operational matters;
- e) Final accountability for all safety issues.

Figure 4. Manager Attributes (CAA 2014)

Additionally, safety policy should be developed by senior manager to:

- a) Strive to achieve the highest safety standards;
- b) Comply with all applicable legal requirements, meet all applicable standards and consider best practice;
- c) Provide appropriate resources;
- d) Determining safety as a primary responsibility of all staff especially managers;
- e) Ensure that the policy is implemented and understood at all levels, both internally and externally.

Figure 5. Safety Policy (CAA 2014)

For electrical operations engineer Cat B2 is required for supervision (CAA 2007):

- Electrical preparation
- Optional electrical configuration
- Electrical reconfiguration

For mechanical operations engineer Cat B1 is required for supervision (CAA 2007):

- Towing
- Airframe preparation
- Aircraft lifting
- Airframe levelling
- Airframe lowering

According to CAA safety manager should be appointed that will overlook health and safety aspects of operations, as well as be responsible for “the development, administration, maintenance and promotion of an effective safety management system.” (2014). He must be given status that will

help him work towards those aims (CAA 2014). Safety manager should possess following skills (Figure 6):

The safety manager should possess:

- a) Broad operational knowledge and experience in the functions of the organisation and the supporting systems;
- b) Analytical and problem solving skills;
- c) Effective oral and written communication skills;
- d) An understanding of human and organisational factors;
- e) Detailed knowledge of safety management principles and practices.

Figure 6. Requirements for Safety Manager (CAA 2014)

As stated by CAA: "The safety manager should be a full-time employee although in a small complex or non-complex organisation it may be a part time role shared with other duties. They may also be the compliance monitoring/ quality manager, but in such cases, there will need to be independent compliance monitoring of the SMS." (2014) Meaning, there is a need for independent checking in company since supervisor may be appointed safety managers.

Additionally, safety manager should be responsible for following (Figure 7):

- a) Manage the SMS implementation plan on behalf of the accountable manager;
- b) facilitate the risk management process that should include hazard identification, risk assessment and risk mitigation;
- c) monitor corrective actions to ensure their accomplishment;
- d) provide periodic reports on safety performance;
- e) maintain safety management documentation;
- f) ensure that there is safety management training available and that it meets acceptable standards;
- g) provide advice on safety matters;
- h) initiate and participate in occurrence / accident investigations;
- i) to collate, understand and disseminate information from other similar organisations, the regulator and contracted organisations.

Figure 7. Responsibilities of Safety Manager (CAA 2014)

Independent Checking

For independent checking Safety Review Board (SRB) may be appointed, or Safety Action Group (SAG) for larger companies (CAA 2014). SRB work is to monitor (Figure 8):

- (a) Safety performance against the safety policy and objectives;
- (b) Effectiveness of the SMS;
- (c) Effectiveness of the safety oversight of sub-contracted organisations;
- (d) Corrective or mitigating actions are being taken in a timely manner;
- (e) Effectiveness of the organisation's safety management processes.

Figure 8. SRB responsibilities (CAA 2014)

Safety Action Group can be created for larger organisations where Safety Reaction Group cannot monitor all processes, so that they work on their behalf (CAA 2014). Managers, and supervisors are part of SAG, and according to CAA safety manager may also be part of it (2014). Although, for extremely small companies with less than 20 employees, one committee can be created to work as both SAG and SRB (CAA 2014).

SAG is responsible to monitor (Figure 9):

- a) Operational effectiveness of the safety risk management processes;
- b) Appropriate resolution and mitigation of identified risks;
- c) Assessment of the safety impact of operational changes;
- d) Implementation of corrective action plans;
- e) Corrective action is achieved within agreed timescales;
- f) The effectiveness of safety recommendations and safety promotion.
- g) Results of safety data analysis

Figure 9. SAG (CAA 2014)

Frequency of activity

Rigging and jacking the aircraft is done prior to maintenance or repair (Liberty Aerospace 2011) and cannot be exactly estimated how many times this activity needs to be performed.

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