第 52 屆全國技能競賽

競賽試題及說明

職類名稱：飛機修護職類　　**共 36 頁第 1 頁**

第一站　飛操鋼繩調校

（註：本公開試題在競賽時得約有百分之三十之調整）

一、題目：飛操鋼繩調校

二、說明：

(一)本試題以飛機操縱鋼繩系統調校、鬆緊套保險及鋼繩張力測量為主要考試範圍，保險之裝置、拆卸、安裝位置與現場清理全程均列入評分標準。

(二)針對現場之飛操鋼繩模擬訓練器(如附圖 1)，依據工作單步驟實施操作，選用適當之材料與工具進行鬆緊套保險，並於保險完成後交給裁判人員。經裁判人員同意後，依適當程序將保險之裝置拆下，恢復工作前之情況。

(三)工作完畢，清點現場工具並清理工作現場。

三、評審要點：

(一)完成時限：50分鐘。

(二)技能標準：

1. 了解飛行操縱面鋼繩操縱作動原理，依據公告流程正確安裝飛行操縱鋼繩系統，及實施操縱面調整及操作。

2. 保險材料與線徑規格選擇正確，長度取用時不致過長或過短，選用正確之工具、以正確之方法進行鬆緊套保險之安裝與拆卸。

3. 保險之完成品應符合航空規範之規定：

A. 鋼繩型別測量：需使用游標卡尺確認其選擇之鋼繩型別正確。

B. 鋼繩張力調整及測量：需準確判斷飛機操縱系統鋼繩張力之調整適當。

(三)工作安全態度：

1. 工具之使用是否熟練。

2. 工作安全是否注意。

3. 工具使用前後之檢查與清點。

4. 工作現場之環境清潔保持與整理。

第 52 屆全國技能競賽

飛機修護職類

第一站　飛操鋼繩調校

試題工作單

題目：飛操鋼繩調校

選手編號：_____　　選手姓名：_____

測驗時間：60分鐘　開始時間：_____時_____分，結束時間：_____時_____分

工作程序

一、安裝調校銷至控制桿置中位置。

二、安裝調校銷至鐘型曲桿(Bell-cranks)固定位置。

三、安裝鋼繩鬆緊套。

四、使用游標卡尺執行鋼繩外徑量測。

五、使用張力表執行鋼繩鬆緊套組之張力量測，依據(附表 1)將鋼繩調至適當張力**(場地溫度由裁判指定)**。 量測三次(含)以上取其平均值。

六、檢查控制面中立位置，有必要再次調整鋼繩。

七、#1Tunbuckle 鋼繩保險，必須為 Clip-type(如附圖 2-E)，
#2、#3Tunbuckle 鋼繩保險，必須為 SINGLE WRAP(SPRAL)(如附圖 2-C)。

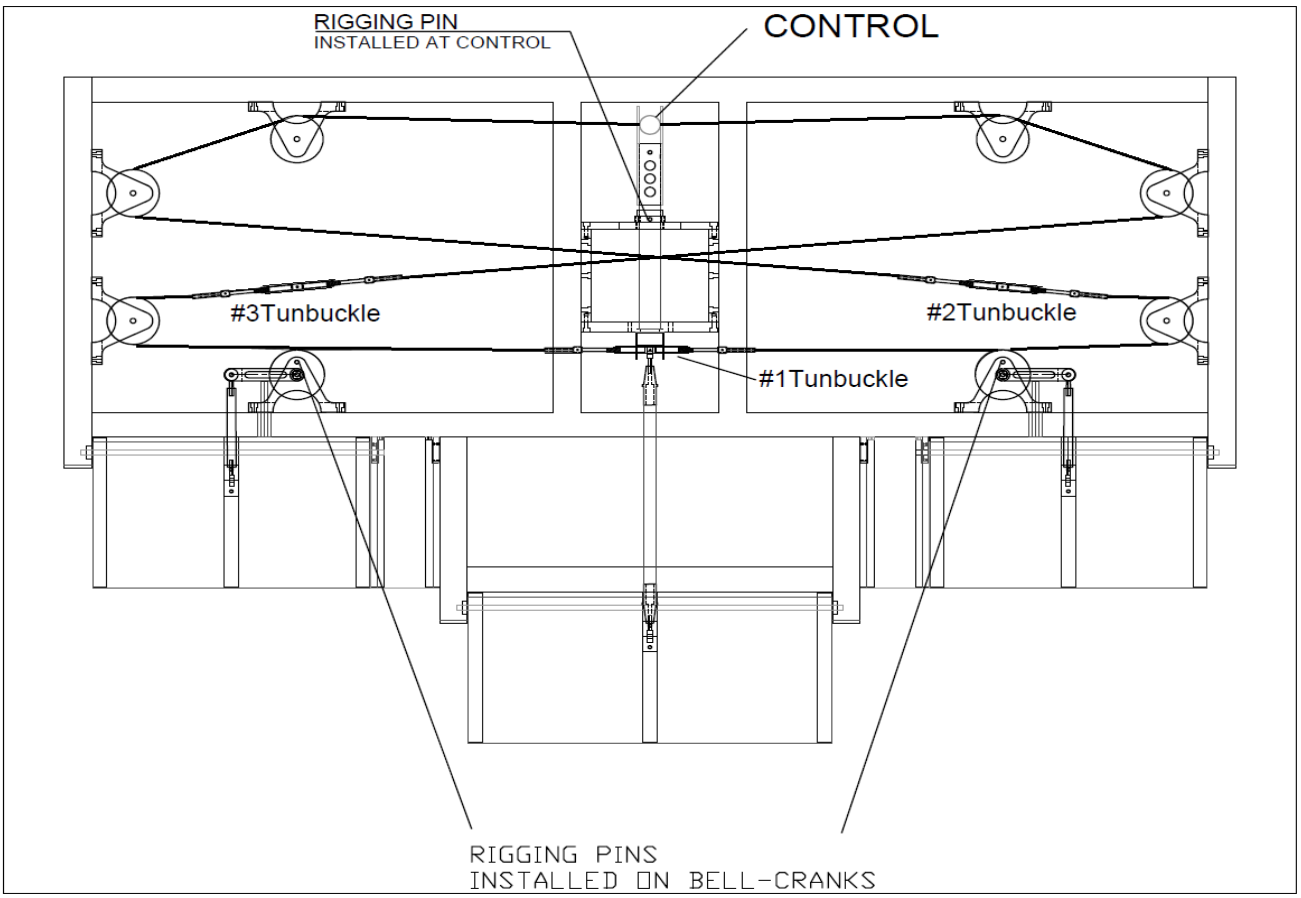
八、再次檢查鋼繩張力，並向裁判人員報告量測結果及填寫張力表實際量測讀值：
左鋼繩鬆緊套鋼繩張力量測讀值：_____。
右鋼繩鬆緊套鋼繩張力量測讀值：_____。

九、移除所有操縱銷(RIGGING PIN)，安裝調校鐘型曲桿(Bell-cranks)，並根據需要調整飛行操控制面行程，向上 $14^0 \pm 1^0$ 角度、向下 $12^0 \pm 1^0$ 角度之行程止點，並執行固定保險。

十、檢查控制移動行程及止檔保險、方向操作桿，及所有飛行控制部件是否正確並固控制面中立位置。

十一、 待裁判人員檢查完後，拆除所有保險，並實施完工後整理。

附圖 1



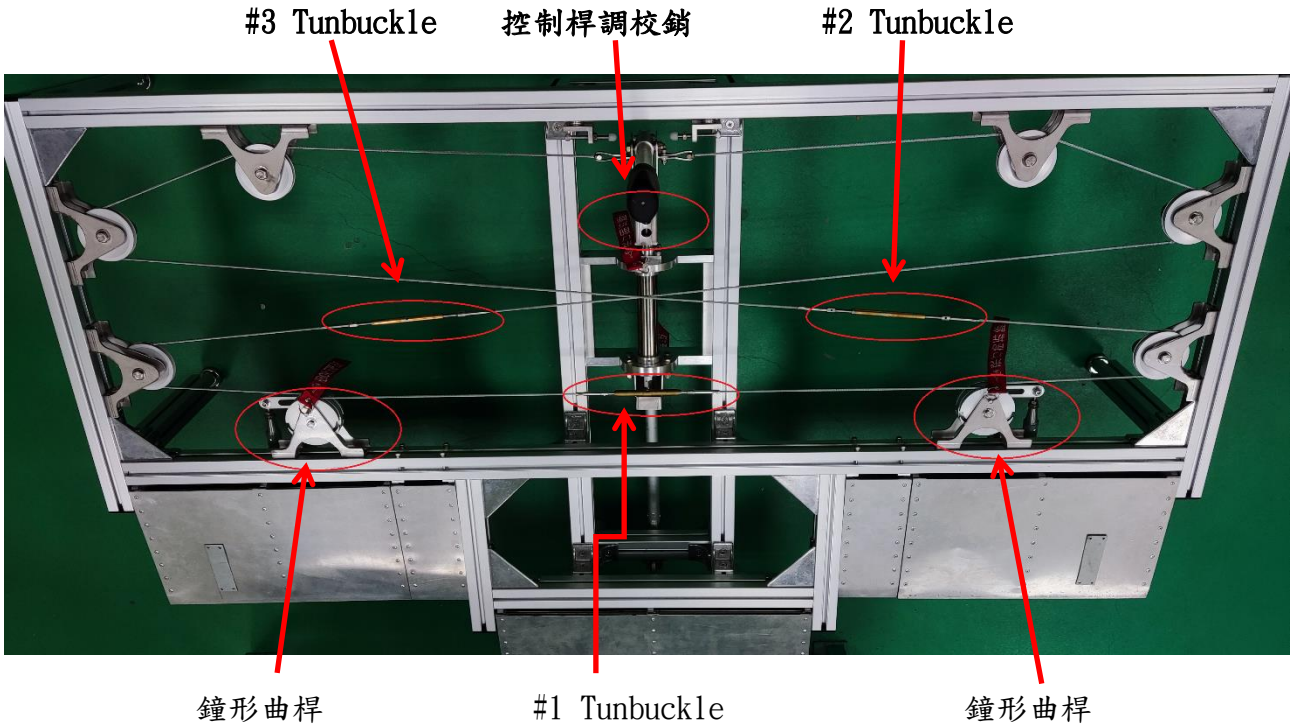
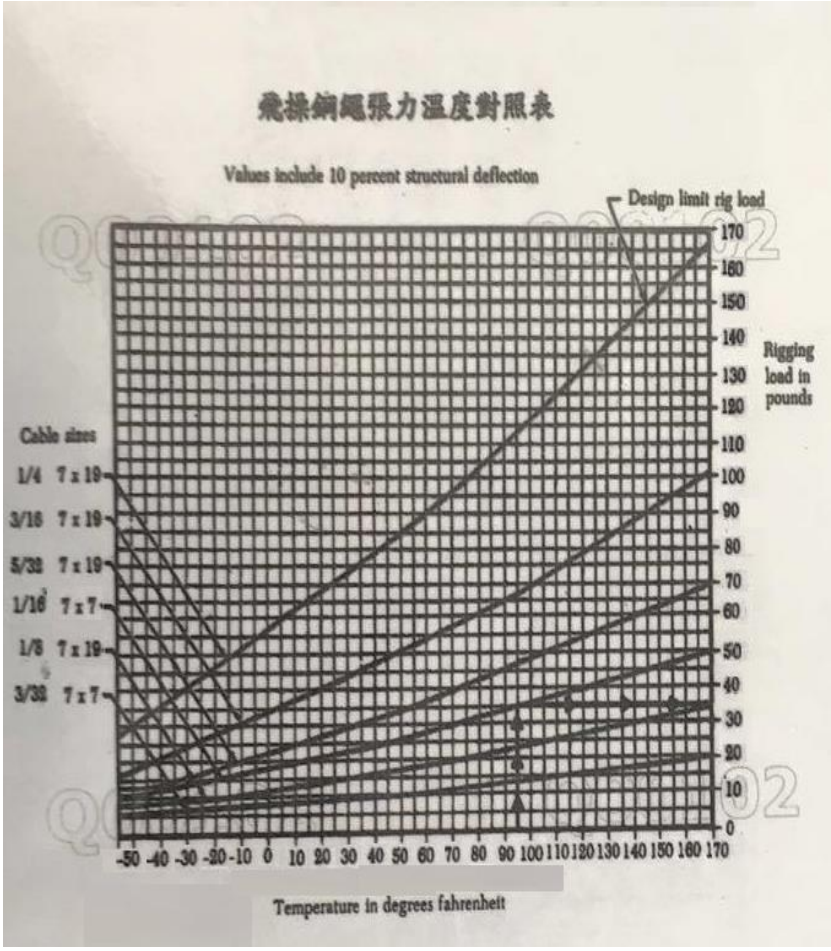
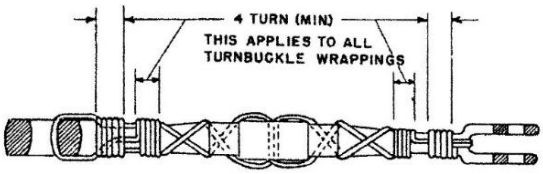


圖 1 飛操鋼繩系統

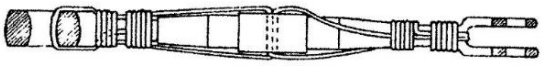
附表 1



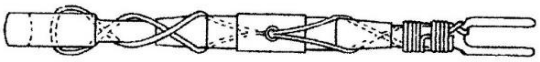
【本表為參考範本，以當日競賽場地提供為主，並僅限用於此次競賽】



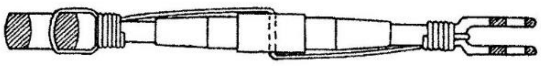
(A) DOUBLE WRAP (SPIRAL)



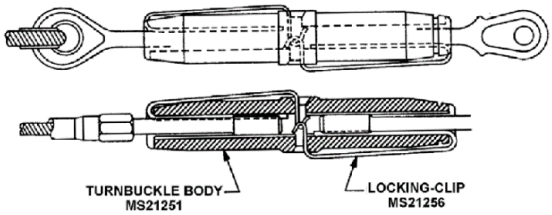
(B) DOUBLE WRAP



(C) SINGLE WRAP (SPIRAL)



(D) SINGLE WRAP



(E)Clip-type locking device

圖 2 鋼繩鬆緊套保險方式

附表 2 鋼繩尺寸對照表

Cable Size (Inch)	Type of Wrap	Diameter of Safety Wire (Inch)
1/16	Single	0.040
3/32	Single	0.040
1/8	Single	0.040
1/8	Double	0.040
5/32 and greater	Double	0.040
5/32 and greater	Single	0.057
5/32 and greater	Double	0.051

第 52 屆全國技能競賽

競賽試題及說明

職類名稱：飛機修護職類　　**共 36 頁第 頁**

第二站　技術手冊查閱與翻譯

（註：本公開試題在競賽時得約有百分之三十之調整）

一、題目：技術手冊查閱與翻譯。

二、說明：

（一）本試題執行原文飛機維護技術手冊查閱與翻譯工作。

（二）依指定問題執行相對飛機維護手冊查閱，依據情況查閱飛機維護手冊相關之章節及頁次，並將相對飛機維護手冊所對應問題之標準維護、檢查及作業方法、內容及程序結果填入工作單中並進行了解及翻譯工作。

（三）本試題主要考試範圍以波音飛機 B747-400 之 Airframe Maintenance Manual(AMM), 章節 Chapter 5,12,20,28 飛機維護手冊為主。。

(四)工作完畢，整理手冊並清理工作場地。

三、評審要點：

(一)完成時限：50 分鐘

(二)技能標準：

1. 依指定問題執行相對飛機維護手冊章節及頁次查閱工作。
2. 飛機維護手冊找出所對應問題之標準維護、檢查及作業方法及程序。
3. 維護手冊內容及程序進行了解及翻譯工作。

(三)工作安全與態度

1. 飛機維護手冊查閱使用是否熟練。
2. 工作態度認真良好。

第 52 屆全國技能競賽

飛機修護職類

第二站　技術手冊查閱與翻譯

工作單

題目：技術手冊查閱與翻譯。

選手編號：_____　　選手姓名：_____

測試時間：50 分鐘　　開始時間：_____時_____分；結束時間：_____ 時_____分

工作程序(範例)

一、請寫出下列之中文名稱？

1. AMM 維修手冊 28-22-00 章中,最新修訂版頁次為：
   Page:_____　修訂日期為:_____(5 分)

2. AMM 第 12-21-16 page-301 章(章-節-目/開始頁次)中英文名為：
   _____
   _____(10 分)

二、請寫出下列之手冊相關技術問題？

1. 執行 B747-400 飛機鼻輪起落架拖車作業時，若飛機拖車拖行角度超過_____度以及_____ 時飛機必須執行_____檢查，需參考 AMM 維修手冊 _____ - _____ - _____ page-_____ (章-節-目/開始頁次)。(15 分)

2. 執行 B747-400 飛機液壓管件配件安裝作業時，如果安裝 3/8 吋不鏽鋼螺帽接不鏽鋼液壓螺紋管上扭力時，需參考 AMM 維修手冊 _____ - _____ - ____ page-_____ (章-節-目/頁次)，依手冊標準規定需要上多少_____-_____ LB-INCHES(最小-最大)扭力值。(15 分)

3. 要知道 B747-400 飛機定期維護主要有哪些項目，需參考 AMM 維修手冊 _____ - _____ - _____ page-_____ (章-節-目/頁次) 得知; 一般定期維護主要是有哪些項目？(15 分)

三、查閱手冊問答及翻譯

1. 要知道 B747-400 飛機輪胎胎面磨損或爆胎狀況要執行視情檢查，需參考 AMM 維修手冊 _____ - _____ - _____ page-_____（章-節-目/頁次）(5 分)；一般輪胎胎面磨損或爆胎狀況檢查概要通則是什麼？請寫出英文並翻譯成中文。(15 分)

2. 要了解B747-400 飛機中央機翼油箱回油驅動系統(SCANVENGE SYSTEM)功能及運作，需參考AMM維修手冊 _____ - _____ - _____ page-_____（章-節-目/頁次）(5分)；當在飛行中，飛機中央機翼油箱回油驅動幫浦是如何運作？請寫出英文並翻譯成中文。(15 分)

第 52 屆全國技能競賽

賽試題及說明

職類名稱：飛機修護職類　　**共 19 頁第 1 頁**

第三站 電器線路圖施工與檢試

（註：本公開試題在競賽時得約有百分之三十之調整）

一、題目：電器線路圖施工與檢試

二、說明：

（一）測試競賽者依據線路圖及利用標準接線實作手冊，進行電器線路接線、接點安裝、線束及測試等能力。

（二）飛機電路基本元件認識、基本原理、量測檢視

1. 本試題以使用競賽場之電路系統模型為主要考試範圍。
2. 依據現場裁判人員指定之系統線路圖如圖 1 接線圖、圖 2 電路板圖。
3. 佈線、綁線及安裝方式如參考 1。
4. **電器接頭(CONNECTOR)選用 MIL-DTL-26482 系列：MS-3472 壁置式擦座 + MS-3476 直式擦頭、電器接頭為 14-18P(如圖 3)；**
   端子(Contacts)為壓接式接頭如參考 2，並使用 DMC AF8 或 AFM8 工具進行壓接/退接端子(Contacts)（如參考 3)。
5. 電器接頭固定安裝方式如參考 4；線束標示方式如參考 5。
6. 安裝完成後，檢查測試電路的運作。

（三）操作完成後，將飛機電器系統或電器系統模型恢復關斷之原狀態，並將試題工作單繳交裁判人員。

（四）清點清理具。

三、評審要點：

（一） 完成時限：90 分鐘

（二） 技能標準：

1. 應先執行工作前之「安全確認」養成良好工作習慣，以避免實際工作之危險。
2. 拆裝工具選用適當，操作方法正確，並能正確進行拆裝工作。
3. 可解讀基本之電路原理並製作電路。
4. 可順利讀取線路圖並完成連接後，依現場裁判人員要求實施操作。
5. 能運用三用電表進行量測。
6. 依正確程序將系統或模型恢復原狀。

（三） 工作安全態度：

1. 量具、工具之使用是否熟練。
2. 工作安全是否注意。
3. 量具、工具使用前後之檢查清點。
4. 工作現場之環境清潔保持整理。
5. 工作態度認真良好。

第 52 屆全國技能競賽

職類名稱：飛機修護職類

第三站　電器線路圖施工與檢試

試題工作單

選手編號：_____選手姓名：_____

標準工時：90 分鐘

測試時間：_____時_____分，結束時間：_____時_____分。

工作程序：

壹、接線圖示

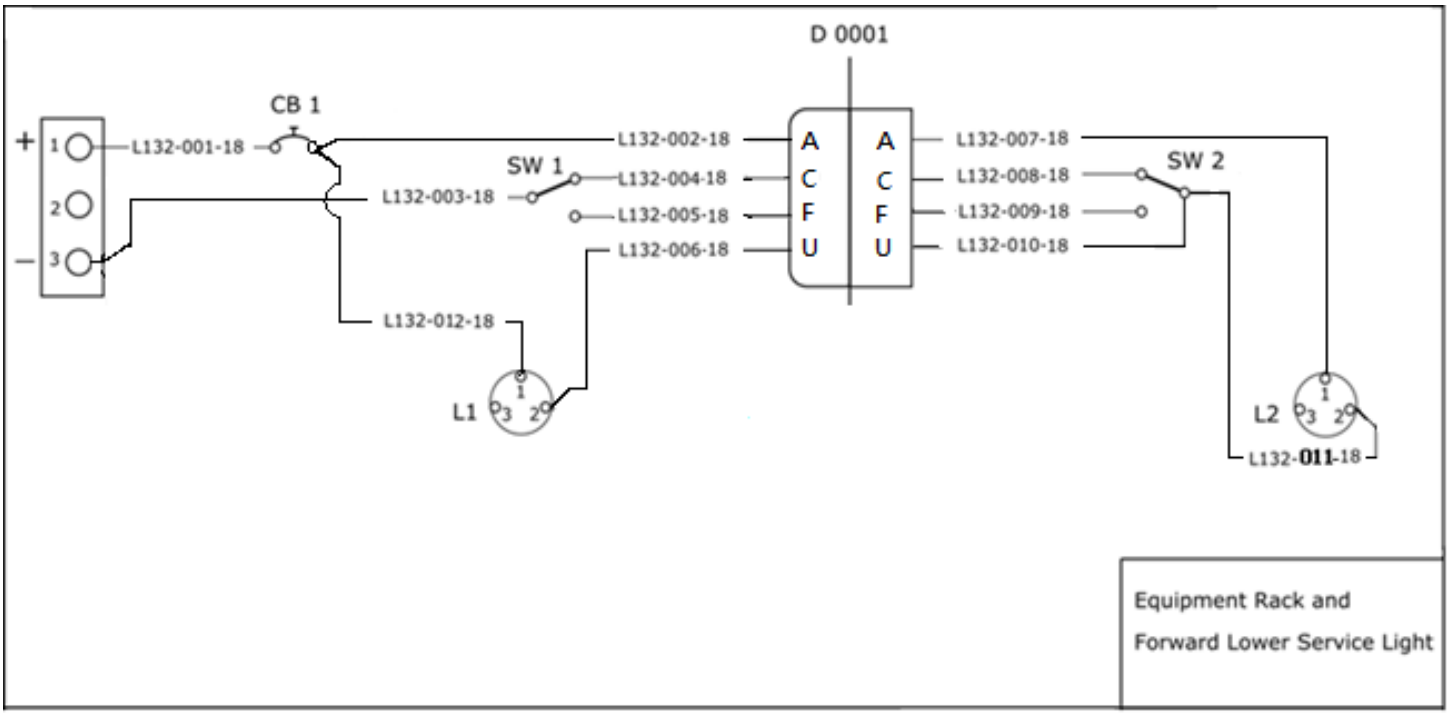


圖 1、接線圖

貳、電路版圖示。

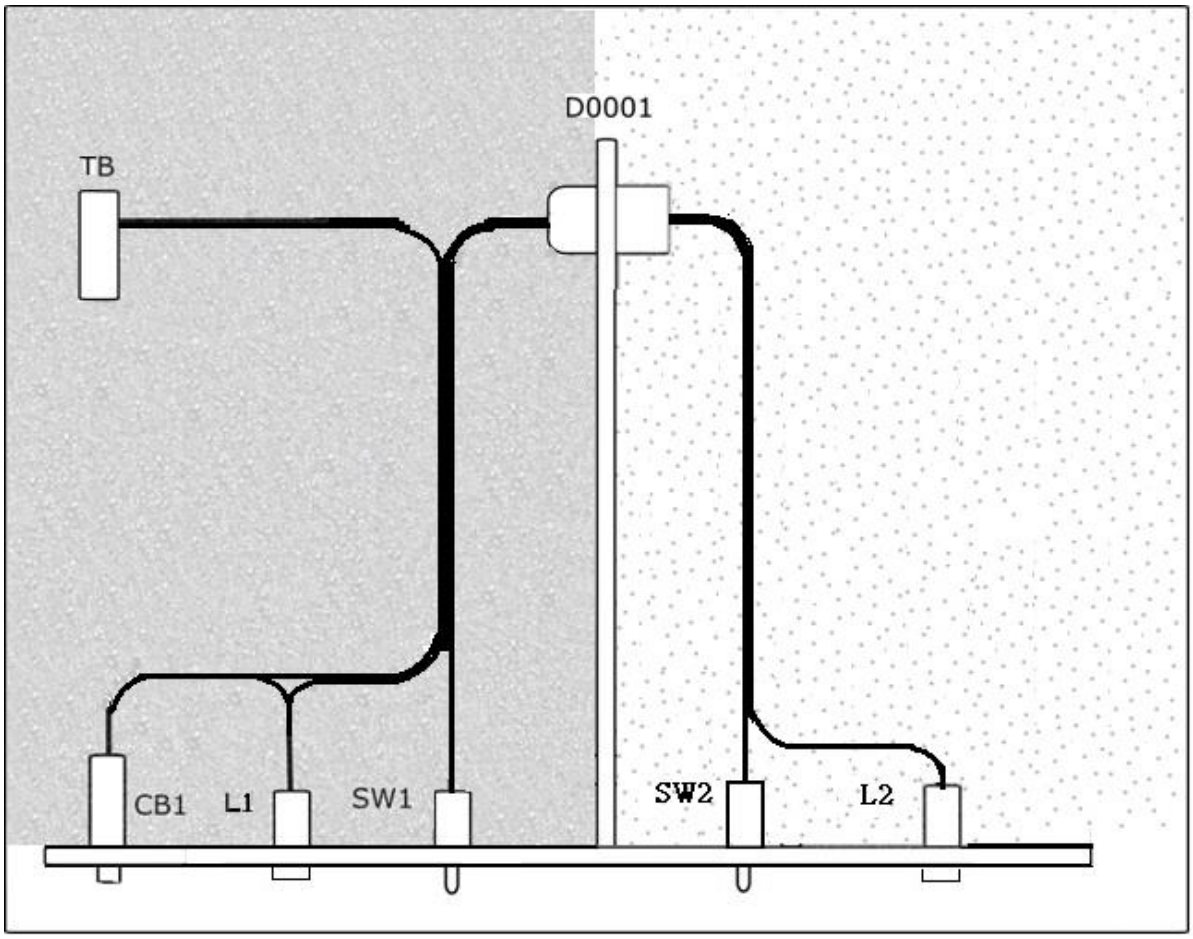
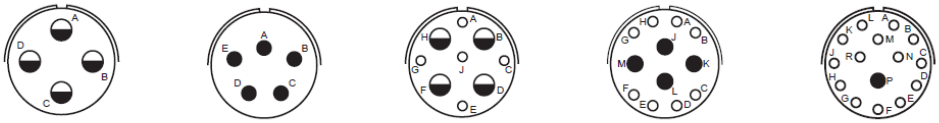
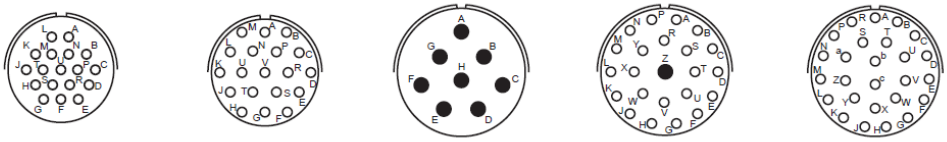


圖 2、電路版圖



Insert Arrangement	14-04	14-05	14-09	14-12	14-15
Service Rating	I	II	I	I	I
Number of Contacts	4	5	5 4	8 4	14 1
Contact Size	12	16	20 12	20 16	20 16



Insert Arrangement	14-18	14-19	16-08	16-23	16-26
Service Rating	I	I	II	I	I
Number of Contacts	18	19	8	22 1	26
Contact Size	20	20	16	20 16	20

圖 3、電器接頭圖

參考資料 1:

For a high vibration area, Vibration Level 2, these conditions are applicable:

- For the 737 model only, the lacing tape wire harness ties on a power feeder wire harness on the leading edge of the wing must be assembled at intervals of a maximum of 2 inches
- Lacing tape wire harness ties must be assembled at intervals between 6 inches and 8 inches
- The necessary number of lacing tape wire harness ties must be assembled on the wire harness to make sure that the wires harness does not bend between the wire harness ties; refer to Figure 3
- The necessary number of lacing tape wire harness ties must be assembled on the wire harness to make sure that the outer diameter of the wire harness does not become larger between the wire harness ties; refer to Figure 3

Not Acceptable

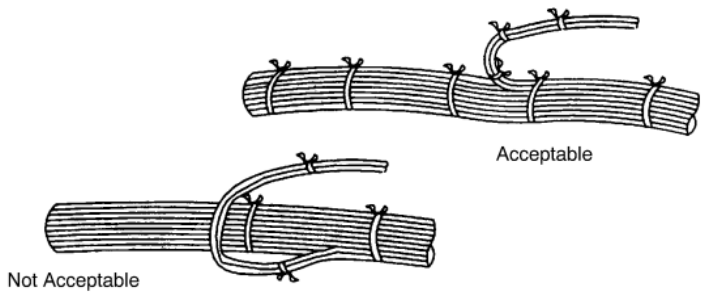
Acceptable

INTERVALS FOR WIRE HARNESS TIES
Figure 3

H. Wire Harness Branches

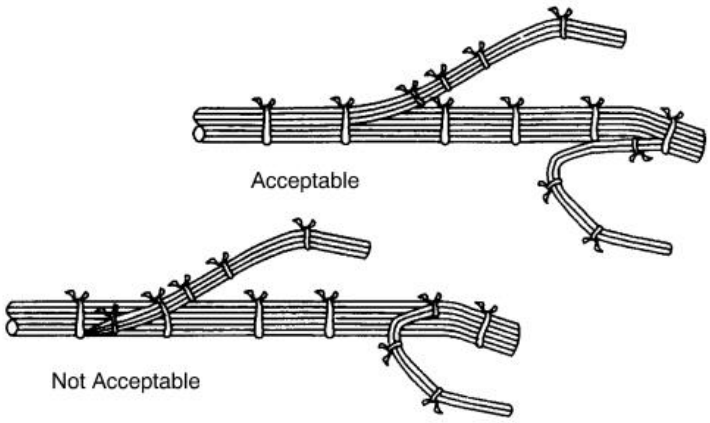
These conditions are applicable:

- If it is possible, a wire harness branch must make a smooth curve from the harness in the same plane as the centerline of the wire harness; refer to Figure 6
- If it is possible, all wires must be parallel and adjacent to each other and the wire harness before the wire harness branch is made
- If it is possible, a wire harness tie must be assembled or a plastic tie strap installed a maximum of 1 inch in front of the wire harness branch
- If it is possible, a wire harness tie must be assembled or a plastic tie strap installed a maximum of 1 inch behind the wire harness branch
- If it is possible, the wire harness branch must not go across other wires when it makes a curve from the wire harness; refer to Figure 7
- When a wire harness has a small number of wires that go to the branch point from opposite directions, a wire harness tie must be assembled or a plastic tie strap installed on the wire harness and the wires at the point of the branch; refer to Figure 8
- If the wire harness branch must go across the wire harness, the wire harness must have protection; refer to Figure 9 and Figure 10.
- Adhesive tape wire harness ties are not permitted on a wire harness branch.

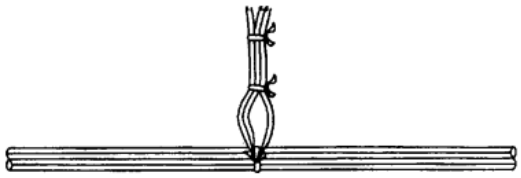


ONE BRANCH ON A WIRE HARNESS
Figure 6

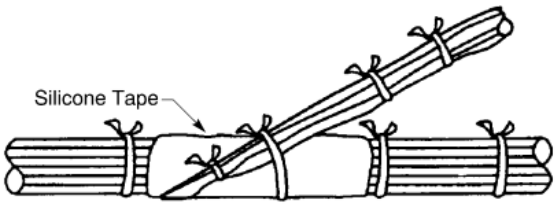
WIRING ASSEMBLY AND INSTALLATION CONFIGURATION



MORE THAN ONE BRANCH ON A WIRE HARNESS
Figure 7

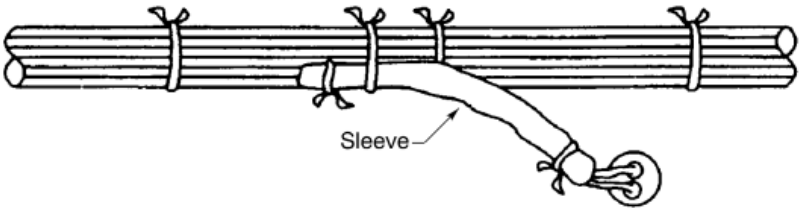


A BRANCH WITH WIRES THAT COME FROM OPPOSITE DIRECTIONS
Figure 8



WIRE HARNESS PROTECTION WITH TAPE
Figure 9

WIRING ASSEMBLY AND INSTALLATION CONFIGURATION



WIRE HARNESS PROTECTION WITH A SLEEVE
Figure 10

(2) Make a clove hitch knot on the wire harness. Refer to Figure 18.

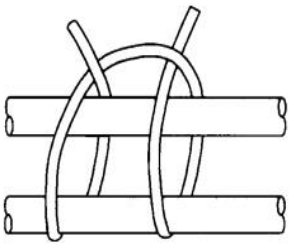
Make sure that:

- All of the wires are parallel
- The knot is tight.

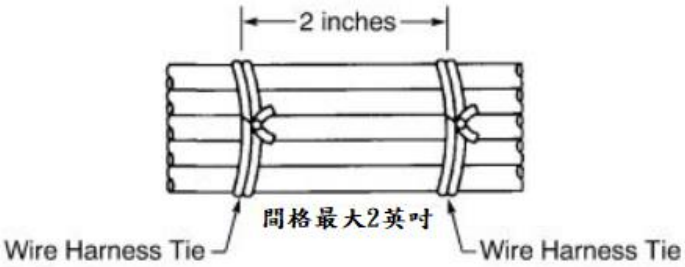
WIRING ASSEMBLY AND INSTALLATION CONFIGURATION

CAUTION: THE WIRES OR THE CABLES MUST NOT GO ACROSS EACH OTHER. DAMAGE TO THE WIRE OR THE CABLES CAN OCCUR.

CAUTION: DO NOT CAUSE DEFORMATION OF THE INSULATION OF THE WIRE OR THE CABLE DURING THE ASSEMBLY OF THE CLOVE HITCH. DAMAGE TO THE WIRE OR THE CABLE CAN OCCUR.



CLOVE HITCH KNOT
Figure 18



(3) Make one of these knots on top of the clove hitch:

- A square knot; refer to Figure 16
- A surgical knot; refer to Figure 17.

(4) Cut the free ends of the lacing tape.

参考资料 2:

DANIELS MANUFACTURING CORPORATION®

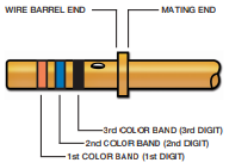
POWER CONTACT TOOLING GUIDE

www.dmctools.com • (407) 855-6161

Scan for on-line M39029 Connector and Contact Cross Reference

Scan to visit DMC Web Site

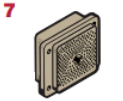
CONTACT COLOR CODE AND BIN*



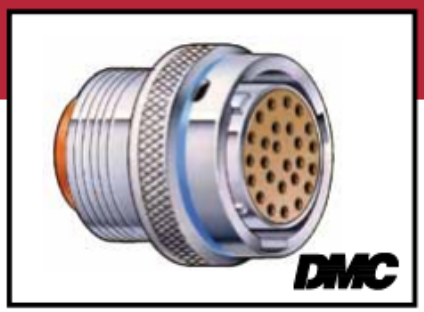
0 – Black (BLK)	5 – Green (GRE)
1 – Brown (BRN)	6 – Blue (BLU)
2 – Red (RED)	7 – Violet (VIO)
3 – Orange (ORN)	8 – Gray (GRA)
4 – Yellow (YEL)	9 – White (WHI)

*BASIC IDENTIFICATION NUMBER

- Example shown: 360 (Orange, Blue, Black)
- Manufacturers have the option of identifying contacts by stamping the BIN code on the shoulder or the wire barrel (size 16 and larger).

CONNECTOR IMAGE	CONNECTOR PART NUMBER	DESCRIPTION	SOURCES	CONTACTS	SIZE (AWG) MATING END	SIZE (AWG) WIRE BARREL	PIN/ SOC.	PART NUMBER (CURRENT)	PART NUMBER (SUPERSEDED)	WIRE RANGE	COLOR CODE (BIN)	CRIMP TOOL AND ACCESSORY AF8	AFM8	MHH60	39-00	WA23 (POS)	WA23 (DIE)	ASSEMBLY TOOLS INSTALLING	REMOVAL
1 **MIL-DTL-22992** CLASS L CIRCULAR • HEAVY DUTY FRONT RELEASE CONTACTS	MS90555	WALL MOUNT RECEPTACLE	AMPHENOL CORP. ROBERT TECHNOLOGIES	TYPICAL CONTACT CONFIGURATION	6	6	P	M39029/48-317	M90559-11	6					WA23-10	WA23-3	By Hand	DRK178-6A
					6N	6	P	M39029/48-318	M90559-12	6					WA23-10	WA23-3	By Hand	DRK178-6A
	MS90556	STRAIGHT PLUG			6G	6	P	M39029/48-319	M90559-14	6					WA23-10	WA23-3	By Hand	DRK178-6A
					6	6	S	M39029/49-329	M90560-7	6					WA23-10	WA23-3	By Hand	DRK178-6A
	MS90557	IN-LINE RECEPTACLE			6G	6	S	M39029/49-330	M90560-8	6					WA23-10	WA23-3	By Hand	DRK178-6A
					4	4	P	M39029/48-320	M90559-8	4					WA23-12	WA23-4	By Hand	DRK178-5A
	MS90558	WALL MOUNT PLUG			4N	4	P	M39029/48-321	M90559-9	4					WA23-12	WA23-4	By Hand	DRK178-5A
					4G	4	P	M39029/48-322	M90559-13	4					WA23-12	WA23-4	By Hand	DRK178-5A
					4	4	S	M39029/49-331	M90560-5	4					WA23-12	WA23-4	By Hand	DRK178-5A
					4G	4	S	M39029/49-332	M90560-9	4					WA23-12	WA23-4	By Hand	DRK178-5A
					0	0	P	M39029/48-323	M90559-5	0					WA23-14	WA23-5	By Hand	DRK178-3A
					0N	0	P	M39029/48-324	M90559-6	0					WA23-14	WA23-5	By Hand	DRK178-3A
					0	0	S	M39029/49-333	M90560-3	0					WA23-14	WA23-5	By Hand	DRK178-3A
					2/0	2/0	P	M39029/48-325	M90559-3	2/0					WA23-15	WA23-6	By Hand	DRK178-2A
					2/0N	2/0	P	M39029/48-326	M90559-3	2/0					WA23-15	WA23-6	By Hand	DRK178-2A
					2/0	2/0	S	M39029/49-334	M90560-2	2/0					WA23-15	WA23-6	By Hand	DRK178-2A
					4/0	4/0	P	M39029/48-327	M90559-1	4/0					WA23-16	WA23-7	By Hand	DRK178-1A
					4/0N	4/0	P	M39029/48-328	M90559-2	4/0					WA23-16	WA23-7	By Hand	DRK178-1A
					4/0	4/0	S	M39029/49-335	M90560-1	4/0					WA23-16	WA23-7	By Hand	DRK178-1A
2 **MIL-DTL-24308** MINIATURE RECTANGULAR RACK & PANEL REAR RELEASE CONTACTS	M24308/2	POLARIZED SHELL SOCKET CONTACTS	ADI ELECTRONICS INC. AMPHENOL CORP. CW INDUSTRIES CINCH CONNECTOR CRISTEK INTERCONNECTS INC. SOURIAU GLASSEAL PRODUCTS INC. ITT CANNON POSITRONIC INDUSTRIES INC. TE CONNECTIVITY	TYPICAL CONTACT CONFIGURATION	20	20	P	M39029/64-369	M24308/11-1	20-24		TP585	K13-1	86-30-1				DAK145 or M81969/1-02	DRK145 or M81969/1-02
	M24308/4	POLARIZED SHELL PIN CONTACTS			20	20	P	M39029/64-657		20-24		TP585	K13-1	86-30-1					
	M24308/6	POLARIZED SHELL SOCKET CONTACTS NON-MAGNETIC			20	20	S	M39029/63-368	M24308/10-1	20-24		TP585	K13-1	86-30-1				DAK145 or M81969/1-02	DRK145 or M81969/1-02
	M24308/6	POLARIZED SHELL PIN CONTACTS NON-MAGNETIC			20	20	S	M39029/63-656		20-24		TP585	K13-1	86-30-1					
					22	22D	P	M39029/58-360	M24308/13-1	22-28			K42	86-6				DAK95-22MB or M81969/1-04	DRK95-22MB or M81969/1-04
					22	22D	S	M39029/57-354	M24308/12-1	22-28			K41	86-5				DAK95-22MB or M81969/1-04	DRK95-22MB or M81969/1-04
3 **MIL-DTL-26482** SERIES 1 CIRCULAR • BAYONET COUPLING FRONT RELEASE CONTACTS	MS3120	WALL MOUNT FLANGE RECEPTACLE	AMPHENOL CONNECTORS ARRAY CONNECTORS CORP. BURNDY ITT CANNON VEAM	TYPICAL CONTACT CONFIGURATION	12	12	P	M39029/31-234	MS3192-12-12A	12-14		TH1A						DAK12B	DRK12B
	MS3121	CABLE CONNECTING PLUG			12	12	S	M39029/32-253	MS3193-12-12A	12-14		TH1A						DAK12B	DRK12B
	MS3122	BOX MOUNT FLANGE RECEPTACLE			16	16	P	M39029/31-228	MS3192-16-16A	16-20		TH1A		86-2				DAK16B	DRK16B
	MS3124	JAM NUT REAR MOUNT RECEPTACLE			16	16	S	M39029/32-247	MS3193-16-16A	16-20		TH1A		86-2				DAK16B	DRK16B
	MS3126	STRAIGHT PLUG			20	20	P	M39029/31-240	MS3192-20A-20A	20-24		TH1A	K1S	86-1S				DAK20B	DRK20B
	MS3127	BOX MOUNT FLANGE RECEPTACLE			20	20	S	M39029/32-259	MS3193-20A-20A	20-24		TH1A	K1S	86-1S				DAK20B	DRK20B
	MS3128	WALL MOUNT FLANGE RECEPTACLE																	
4 **MIL-DTL-26482** SERIES 2 CIRCULAR • BAYONET COUPLING REAR RELEASE CONTACTS	MS3470	WALL MOUNT FLANGE RECEPTACLE	AERO ELECTRONIC CONNECTOR, INC. AMPHENOL CONNECTORS DEUTSCH BURNDY ITT CANNON HERMETIC SEAL CORPORATION	TYPICAL CONTACT CONFIGURATION	12	12	P	M39029/4-113	M39029/4-12-12	12-14		TH1A						DAK83-12B	DRK83-12B
					12	12	S	M39029/5-118	M39029/5-12-12	12-14		TH1A						DAK83-12B	DRK83-12B
	MS3471	CABLE CONNECTING RECEPTACLE			12	16	P	M39029/4-114	M39029/4-12-16	16-20		TH1A		86-2				DAK83-12B	DRK83-12B
					12	16	S	M39029/5-119	M39029/5-12-16	16-20		TH1A		86-2				DAK83-12B	DRK83-12B
	MS3472	WIDE FLANGE WALL MOUNT RECEPTACLE			16	16	P	M39029/4-111	M39029/4-16-16	16-20		TH1A		86-2				DAK83-16B	DRK83-16B
					16	16	S	M39029/5-116	M39029/5-16-16	16-20		TH1A		86-2				DAK83-16B	DRK83-16B
	MS3474	JAM NUT RECEPTACLE			16	20	P	M39029/4-112	M39029/4-16-20	20-24		TH1A	K1S	86-2				DAK83-16B	DRK83-16B
					16	20	S	M39029/5-117	M39029/5-16-20	20-24		TH1A	K1S	86-2				DAK83-16B	DRK83-16B
	MS3475	PLUG RFI			20	20	P	M39029/4-110	M39029/4-20-20	20-24		TH1A	K1S	86-1S				DAK83-20B	DRK83-20B
					20	20	S	M39029/5-115	M39029/5-20-20	20-24		TH1A	K1S	86-1S				DAK83-20B	DRK83-20B
	MS3476	STRAIGHT PLUG																	
5 **MIL-DTL-26500** CIRCULAR THREADED OR BAYONET COUPLING FRONT RELEASE CONTACTS	MS24264	FLANGE MOUNT RECEPTACLE	PYLE-NATIONAL (AMPHENOL) CINCH CONNECTOR DIVISION HERMETIC SEAL CORPORATION AMERICAN MICRO PRODUCTS, INC. DETORONICS ITT CANNON SOURIAU	TYPICAL CONTACT CONFIGURATION	12	12	P	M39029/31-235	MS24254-12P	12-14		TH1A						DAK12B	DRK12B
	MS24265	SINGLE HOLE MOUNT RECEPTACLE			12	12	S	M39029/32-254	MS24255-12S	12-14		TH1A						DAK12B	DRK12B
	MS24266	STRAIGHT PLUG			16	16	P	M39029/31-229	MS24254-16P	16-20		TH1A		86-2				DAK16B	DRK16B
					16	16	S	M39029/32-248	MS24255-16S	16-20		TH1A		86-2				DAK16B	DRK16B
	MS27613	WALL MOUNT RECEPTACLE			20	20	P	M39029/31-241	MS24254-20P	20-24		TH1A	K1S	86-1S				DAK20B	DRK20B
					20	20	S	M39029/32-260	MS24255-20S	20-24		TH1A	K1S	86-1S				DAK20B	DRK20B
	MS27614	JAM NUT																	
	MS27615	PLUG																	
6 **MIL-DTL-83527** (ARINC 600) RECTANGULAR RACK AND PANEL REAR RELEASE CONTACTS	MIL-DTL-83527/1	PLUG, RACK TO PANEL, SHELL SIZE 2	TE CONNECTIVITY SOURIAU ITT CANNON	TYPICAL CONTACT CONFIGURATION	22	22	P	M39029/93-597		22-26			K267-1	86-137				M81969/1-01	M81969/1-01
	MIL-DTL-83527/2	RECEPTACLE, RACK TO PANEL, SHELL SIZE 2			22	22	S	M39029/94-601		22-26			K267-1	86-137				M81969/1-01	M81969/1-01
	MIL-DTL-83527/3	PLUG, RACK TO PANEL, SHELL SIZE 3			20	20	P	M39029/93-598		20-24		TP585	K13-1	86-30-1				M81969/1-02	M81969/1-02
	MIL-DTL-83527/4	RECEPTACLE, RACK TO PANEL, SHELL SIZE 3			20	20	S	M39029/94-602		20-24		TP585	K13-1	86-30-1				M81969/1-02	M81969/1-02
	MIL-DTL-83527/5	PLUG, RACK TO PANEL, SHELL SIZE 4			16	16	P	M39029/93-539		16-20		TH1A		86-2				M81969/1-03	M81969/1-03
	MIL-DTL-83527/6	RECEPTACLE, RACK TO PANEL, SHELL SIZE 4			16	16	S	M39029/94-603		16-20		TH1A		86-2				M81969/1-03	M81969/1-03
	MIL-DTL-83527/7	PLUG, RACK TO PANEL, MULTI-INSERT			12	12	P	M39029/93-540		12-14		TP465							DRK337
	MIL-DTL-83527/8	RECEPTACLE, RACK TO PANEL, MULTI-INSERT			12	12	S	M39029/94-604		12-14		TP465							DRK337
7  **MIL-DTL-28748** RECTANGULAR • RACK AND PANEL	M28748/3	PIN CONTACTS SIZE 16 & 20	CONTINENTAL CONNECTOR CO. POSITRONIC INDUSTRIES, INC. WINCHESTER ELECTRONICS DELPHI CONNECTION SYSTEMS J-TECH, INC.	TYPICAL CONTACT CONFIGURATION	16	16	P	M39029/36-278	MS17807-16-16	16-20		TH4						DAK123A	DRK124A
					16	16	S	M39029/37-280	MS17808-16-16	16-20		TH4						DAK123A	DRK124A
	M28748/4	SKT CONTACTS SIZE 16 & 20			16	20	P	M39029/36-277	MS17807-16-20	20-24		TH4						DAK123A	DRK124A
					16	20	S	M39029/37-279	MS17808-16-20	20-24		TH4						DAK123A	DRK124A
	M28748/9	PIN CONTACTS 16 POLARIZED CENTER SCREW LOCK			16	16	P	M39029/34-273	MS17803-16-16	16-20		TH4		86-146				DAK123A	DRK124A
					16	16	S	M39029/35-276	MS17804-16-16	16-20		TH4		86-146				DAK123A	DRK124A
	M28748/10	SKT CONTACTS 16 POLARIZED CENTER SCREW LOCK			16	20	P	M39029/34-272	MS17803-16-20	20-24		TH4		86-146				DAK123A	DRK124A
					16	20	S	M39029/35-275	MS17804-16-20	20-24		TH4		86-146				DAK123A	DRK124A
	M28748/13	PIN CONTACTS 22			20	20	P	M39029/34-271	MS17803-20-20	20-24		TH4		86-146				DAK123A	DRK124A
					20	20	S	M39029/35-274	MS17804-20-20	20-24		TH4		86-146				DAK123A	DRK124A
	M28748/14	SKT CONTACTS 22			22	22	P	M39029/34-440	M39029/34-22-22	22-26			K280					DAK123A-22A	DRK124A-22A
					22	22	S	M39029/35-441	M39029/35-22-22	22-26			K280					DAK123A-22A	DRK124A-22A
8	M28840/10	WALL MOUNT RECEPTACLE			20	20	P	M39029/83-508	M39029/83-20-20	20-24			K534		39-102			DAK55-22SA	DRK56-22A

MIL-DTL-26482
SERIES 2



CIRCULAR
BAYONET COUPLING
REAR RELEASE CONTACTS

For Backshell Torquing Tools, see page 65.

CONNECTOR P/N	DESCRIPTION	QPL SOURCES
MS3470	WALL MOUNT FLANGE RECEPTACLE	AERO ELECTRIC, AMPHENOL, DEUTSCH BURNDY, ITT CANNON, HERMETIC SEAL CORPORATION
MS3471	CABLE CONNECTING PLUG	
MS3472	WIDE FLANGE WALL MOUNT RECEPTACLE	
MS3474	JAM NUT REAR MOUNT RECEPTACLE	
MS3475	PLUG RFI	
MS3476	STRAIGHT PLUG	

CONTACTS	SIZE (AWG)		PIN/SOC.	PART NUMBER* (CURRENT)	PART NUMBER (SUPERSEDED)	WIRE RANGE
	MATING END	WIRE BARREL				
TYPICAL CONTACT CONFIGURATION	12 12	12 12	P S	M39029/4-113 M39029/5-118	M39029/4-12-12 M39029/5-12-12	12-14 12-14
	12 12	16 16	P S	M39029/4-114 M39029/5-119	M39029/4-12-16 M39029/5-12-16	16-20 16-20
	16 16	16 16	P S	M39029/4-111 M39029/5-116	M39029/4-16-16 M39029/5-16-16	16-20 16-20
	16 16	20 20	P S	M39029/4-112 M39029/5-117	M39029/4-16-20 M39029/5-16-20	20-24 20-24
	20 20	20 20	P S	M39029/4-110 M39029/5-115	M39029/4-20-20 M39029/5-20-20	20-24 20-24

TOOL SELECTION		CRIMP TOOL AND ACCESSORY					ASSEMBLY TOOLS	
BIN*	COLOR	AF8	AFM8	MH860	WA23 (POS)	WA23 (DIE)	INSTALLING	REMOVAL
113 118	BROWN-BROWN-ORANGE BROWN-BROWN-GRAY	TH1A TH1A					DAK83-12B DAK83-12B	DRK83-12B DRK83-12B
114 119	BROWN-BROWN-YELLOW BROWN-BROWN-WHITE	TH1A TH1A		86-2 86-2			DAK83-12B DAK83-12B	DRK83-12B DRK83-12B
111 116	BROWN-BROWN-BROWN BROWN-BROWN-BLUE	TH1A TH1A		86-2 86-2			DAK83-16B DAK83-16B	DRK83-16B DRK83-16B
112 117	BROWN-BROWN-RED BROWN-BROWN-VIOLET	TH1A TH1A		86-2 86-2			DAK83-16B DAK83-16B	DRK83-16B DRK83-16B
110 115	BROWN-BROWN-BLACK BROWN-BROWN-GREEN	TH1A TH1A	K1S K1S	86-1S 86-1S			DAK83-20B DAK83-20B	DRK83-20B DRK83-20B

**The three number suffix on M39029 series contacts is referred to as a "BIN" code. See page 22 for color stripe association.*

Contact M39029/7-126 to 128 (Shielded Pin) #12 cavity, see page 78.
Contact M39029/8-129 to 131 (Shielded Socket) #12 cavity, see page 78.

Standard Adjustable Crimp Tool

UPPER RANGE CRIMP TOOL AF8 M22520/1-01

The DMC AF8, qualified to MIL-DTL-22520/1*, has virtually limitless application within the specified **wire range of 12 through 26 AWG**. Over a thousand turret heads are available to adapt the tool frame to your specific military or proprietary contact/wire combination. The 8 impression crimp, which is standard in the AF8, assures absolute maximum tensile strength with almost every closed barrel contact. Special indent configurations and gaging are available upon request.

For proper operation, the tool must be mated with one of the following optional accessories: a military standard or non-military turret head (TH-XXX Part No. Series), a military standard or non-military positioner (TP-XXX Part No. Series), or an adjustable head (Part No. UH2-5). This is done simply by orienting the head in the keyed position, and by tightening the hex socket screws provided as part of the head.

The precision ratchet controls cycling of the tool in both directions of handle movement. This assures the same accurate crimp every time. It's like having a quality control inspector at every work station.

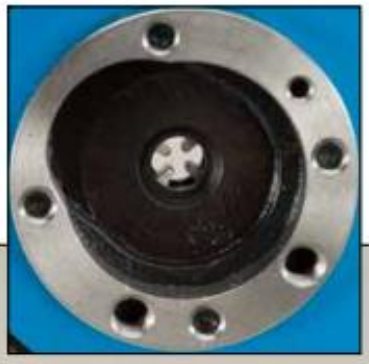
Positive crimp depth is controlled by an 8 position selector knob conveniently located on the tool frame. The operator simply dials the desired step for the wire being used. This setting can be secured by use of a locking pin or safety wire.

The carefully engineered design achieves the absolute maximum mechanical advantage and the tool's light weight helps minimize operator fatigue.

A permanent dataplate is affixed to all turret heads and positioners. This plate lists specific contact part numbers, the corresponding position color code (for 3 position turret heads), and suggested selector depth settings for the wire size being used.

The adjustable head (P/N UH2-5) is ideally suited for lab work and prototype production applications. This head is attached in the same manner as explained above. The selected contact is inserted through the entry hole on the opposite side of the tool frame from the head. The height adjusting screw is then rotated until the contact is in the proper position for crimping. The screw can be secured with the locknut provided. Some testing will be necessary to determine the optimum selector setting for your contact/wire combination.

The AF8 is approximately 9¾" x 2½" x 1¼" and weighs 15 oz.



* Change to SAE AS22520 in process consult DMC for status.

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Miniature Adjustable Crimp Tools

LOWER RANGE CRIMP TOOL AFM8 M22520/2-01

Qualified to MIL-DTL-22520/2*, the DMC AFM8 is designed for most of the miniature and sub-miniature connector types that are so widely used in electronic systems. The AFM8 meets the need for a miniature tool accommodating **wire sizes 20 through 32 AWG**.

The AFM8 gives a Mil-Standard 8 impression crimp, which assures maximum tensile strength. The cycle controlled precision ratchet assures consistently accurate crimps every time. The tool frame has a built-in 8 step selector knob for ease in dialing the correct crimp depth setting for the wire being used.

Positioners adapt the tool frame to a particular application. The data plate on each positioner designates which contacts the positioner accommodates for its wire size and indicates selector position. The positioner is easily removed and changed.

Periodic gaging is recommended to insure accurate calibration. This is easily accomplished with the M22520/3-1 "GO/NO-GO" gage (DMC part no. G125) on SEL setting #8. The AFM8 is 6 3/4" in length and weighs approximately 10 oz.

Other than keeping the tool clean and properly stored when not in use, no operator maintenance is required. *Pneumatic versions of this tool are found on page 12.*

The DMC274 tool kit contains the AFM8 tool frame, tool gage, and all mil-spec positioners. Also included in the DMC274 are tool instruction sheets and a tool selection chart.

* Change to SAE AS22520 in process consult DMC for status.

MILITARY P/N	DMC P/N	DESCRIPTION	NSN
M22520/2-01	AFM8	TOOL FRAME	5120-01-335-8572
M22520/2-02	K1S	POSITIONER	5120-01-335-8592
M22520/2-03	K60S	POSITIONER	5120-01-335-8593
M22520/2-04	K151	POSITIONER	5120-01-335-8594
M22520/2-05	K3	POSITIONER	5120-01-335-8595
M22520/2-06	K41	POSITIONER	5120-01-335-8624
M22520/2-07	K40	POSITIONER	5120-01-335-8625
M22520/2-08	K13-1	POSITIONER	5120-01-335-8626
M22520/2-09	K42	POSITIONER	5120-01-335-8627
M22520/2-10	K43	POSITIONER	5120-01-335-8628
M22520/2-11	K287	POSITIONER	5120-01-335-8629
M22520/2-12	K286	POSITIONER	5120-01-335-8630
M22520/2-13	K338	POSITIONER	5120-01-335-8631
M22520/2-14	K340	POSITIONER	5120-01-335-8632
M22520/2-15	K341	POSITIONER	5120-01-335-8633
M22520/2-16	K339	POSITIONER	5120-01-335-8634
M22520/2-17	K342	POSITIONER	5120-01-335-8635
M22520/2-18	K343	POSITIONER	5120-01-335-8636
M22520/2-19	K330-2	POSITIONER	5120-01-335-8637
M22520/2-20	K331-2	POSITIONER	5120-01-335-8638
M22520/2-21	K332-2	POSITIONER	5120-01-335-8609
M22520/2-22	K212	POSITIONER	5120-01-335-8610
M22520/2-23	K267-1	POSITIONER	5120-01-335-8611
M22520/2-24	K75S-1	POSITIONER	5120-01-335-8612
M22520/2-25	K261-1	POSITIONER	5120-01-335-8613
M22520/2-26	K262-1	POSITIONER	5120-01-335-8614
M22520/2-27	K269-1	POSITIONER	5120-01-335-8615
M22520/2-28	K373-1	POSITIONER	5120-01-335-8616
M22520/2-29	K372-1	POSITIONER	5120-01-335-8617
M22520/2-30	K404	POSITIONER	5120-01-335-8618
M22520/2-31	K406	POSITIONER	5120-01-335-8619
M22520/2-32	K496	POSITIONER	5120-01-335-8620
M22520/2-33	K74S	POSITIONER	5120-01-335-8621
M22520/2-34	K323	POSITIONER	5120-01-335-8622
M22520/2-35	K532-1	POSITIONER	5120-01-335-8623
M22520/2-36	K473	POSITIONER	5120-01-335-8596
M22520/2-37	K709	POSITIONER	5120-01-361-9666
M22520/3-1	G125	GAGE	5220-01-016-6002
	SK2/2	ADJUSTABLE POSITIONER	5120-01-171-1569
	DMC274	M22520/2 TOOL KIT	5180-01-259-0512

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參考資料 3:

DMC DANIELS MANUFACTURING CORPORATION

Other than keeping the unit clean and properly stored when not in service, no operator maintenance is required. DMC offers complete factory service by knowledgeable technicians within a reasonable turnaround time. Complete instructions concerning the use, care and warranty are supplied with each tool. Additional copies are available on request.

Pneumatic versions of this tool are found on page 12.

The battery powered versions of this tool are found on page 10.

MILITARY P/N	DMC P/N	DESCRIPTION	NSN
M22520/1-01	AF8	TOOL FRAME	5120-01-335-8571
M22520/1-02	TH1A	TURRET	5120-01-335-8834
M22520/1-03	TH4	TURRET	5120-01-335-8835
M22520/1-04	TH163	TURRET	5120-01-335-8836
M22520/1-05	UH2-5	ADJUSTABLE POSITIONER	5120-01-335-8583
M22520/1-06	TP45	POSITIONER	5120-01-335-8584
M22520/1-07	TP85	POSITIONER	5120-01-335-8585
M22520/1-08	TH199S	TURRET	5120-00-016-7654
M22520/1-09	TP360	POSITIONER	5120-01-335-8586
M22520/1-10	TP365	POSITIONER	5120-01-335-8587
M22520/1-11	TP465	POSITIONER	5120-01-335-8588
M22520/1-12	TH270	TURRET	5120-01-335-8838
M22520/1-13	TH285	TURRET	5120-01-036-9221
M22520/1-14	TH286	TURRET	5120-01-036-9222
M22520/1-15	TP485	POSITIONER	5120-01-335-8589
M22520/1-16	TP513	POSITIONER	5120-01-335-8590
M22520/1-17	TP651	POSITIONER	5120-01-335-8591
M22520/3-1	G125	GAGE	5220-01-016-6002
	DMC1186	M22520/1 Tool Kit	

The DMC1186 tool kit contains the AF8 tool frame, tool gage, and all mil-spec positioners and turret heads. Also included in the DMC1186 are tool instruction sheets and a tool selection chart.

Periodic gaging is recommended to insure accurate calibration. This can be done easily by setting the tool selector knob to position #4, and checking indenter closure with the M22520/3-1 "GO/NO-GO" gage (DMC part no. G125).

INSERT CONTACT

INSERT PRE-STRIPPED WIRE

CLOSE / OPEN HANDLE

REMOVE TERMINATED WIRE ASSEMBLY

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參考資料 4:

Preshaping Wires

25. Preshape large diameter wires (No. 14 and larger) before soldering to contacts. This will avoid strain on soldered connection when cable clamp is installed. See Figure 10–14.

CAUTION

Preshaping is a necessity for connectors using resilient inserts. Side strain on the contacts will cause contact splaying and prevent proper mating of pin and socket contacts.

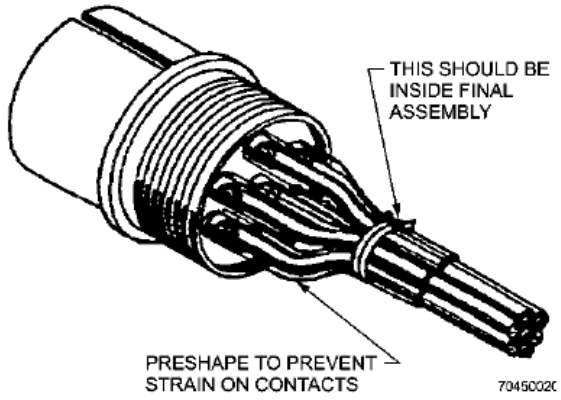
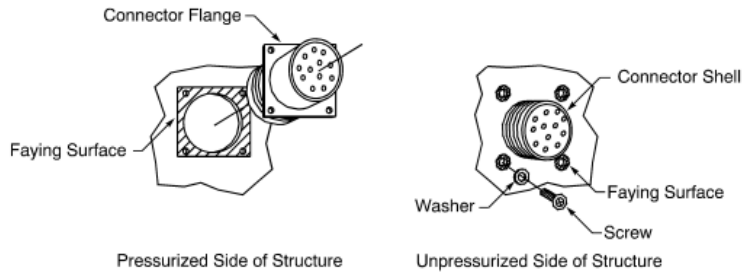
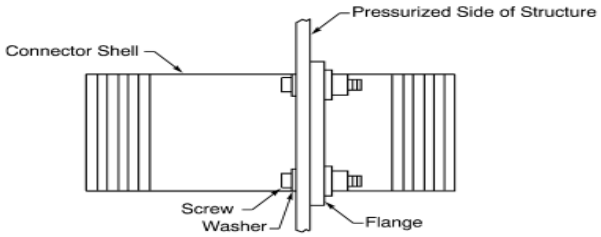


Figure 10–14 Preshaping and Tying Wires

INSTALLATION OF ELECTRICAL CONNECTORS



LOCATION OF THE FAYING SURFACES
Figure 5



CONNECTOR INSTALLATION
Figure 6

參考資料 5:

SPACING OF WIRE IDENTIFICATION

31. Mark wires and cables at intervals of not more than 38cm along their entire lengths (refer Figure 2–2).

In addition, mark wires within 75mm of each junction (except permanent splices), and at each terminating point. Wires less than 15cm long need not be marked.

LOCATION OF SLEEVE MARKING

32. When wire or cable cannot be marked directly, install a sleeve, (refer Figure 2–3) marked with the identification number, over the outer covering at each terminating end and at not more than 90cm intervals along the entire length of the wire or cable.

> NOTE
>
> Do not use sleeves to change the identification of wire or cable that has already been marked, except in the case of spare wires in potted connectors.

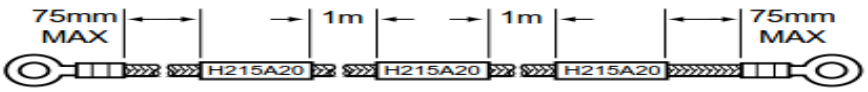


Figure 2–3 Location of Identification Sleeve

WIRE IDENTIFICATION AT TERMINAL BOARDS AND ENCLOSURES

37. If possible, mark wires attached to terminal boards and equipment terminals between termination and the point where wire enters the wire bundle (refer Figure 2–6). Identify wires terminating within an enclosure, inside the enclosure, if space permits.

SELECTION OF IDENTIFICATION SLEEVING

38. For general airframe wiring, in most applications, heat-shrinkable polyethylene tubing should be used to identify wire that cannot be marked directly. Available sizes are given in Section 2, Chapter 4.

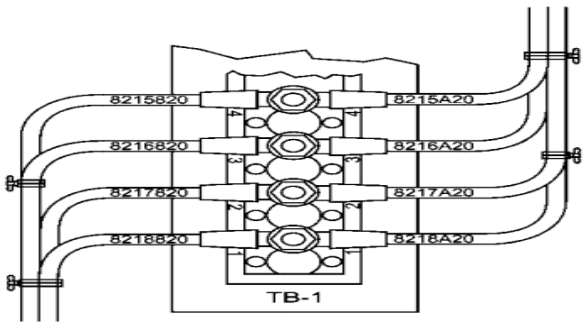


Figure 2–6 Wire Identification at Terminal Board

第 52 屆全國技能競賽

競賽試題及說明

職類名稱：飛機修護職類　　**共 8 頁第 1 頁**

第四站　機體結構補片成型與應用

（註：本公開試題在競賽時得約有百分之三十之調整）

一、題目：機體結構補片成型與應用

二、說明：

(一)結構件在搭配到飛機前必須現場整形配合，此過程叫成型。

(二)本題型測試競賽者詮釋圖說，以高度精準彎曲金屬薄片，依據提供之圖說來佈設扣件與安裝實心鉚釘的能力為競賽範圍。

(三)使用板金折摺機(折床)，依試題所給定之金屬補片大小尺寸執行彎折成型。

(四)使用氣動工具，依試題所給定之金屬補片大小尺寸與鉚釘型號，執行正確選取鉚釘型式與板材之鉚合。

(五)工作完成後，將工件繳交裁判評分。

(六)經裁判確認無誤並獲得同意後，將工具恢復原狀、清點工具並清理工作現場。

附註：本試題將各類型鉚釘置於盒內，選手須自行於鉚釘盒內選取正確型式之鉚釘。

三、評審要點：

(一)完成時限：100 分鐘。

(二)技能標準：

1. 計算展開加工圖尺寸是否正確。
2. 彎折尺寸是否合乎題型尺寸。
3. 鉚接前，預先計算鉚釘數、確認鉚釘型式及尺寸。
4. 以正確程序進行鑽孔與裝置鉚釘，並注意裝置時與裝置後，鉚釘與板材之尺寸與 情況是否合乎規範。

(三)工作安全態度：

1. 工具之使用是否熟練。
2. 工作安全是否注意。
3. 量具、工具使用前後之檢查與清點。
4. 工作現場之環境清潔保持與整理。
5. 工作態度認真良好。

第 52 屆全國技能競賽

試題工作單

職類名稱：飛機修護職類

第四站　機體結構補片成型與應用

題目：機體結構補片成型與應用
選手編號：_____　　選手姓名：_____

測驗時間：100 分鐘　開始時間：_____時_____分，結束時間：_____時_____分

工作程序

一、依金屬補片計畫依據圖 1 工作圖執行以下作業。

二、計算展開加工圖尺寸並計算寫出數據(附圖 2)，請計算至小數點第三位。

三、將領到之兩片 5 吋×5 吋×0.063 吋鋁合金材料，依工作圖執行彎折作業。

四、依工作圖(附圖 1)兩鋁板彎折各 90^0 ，施以鏡面對稱鉚接。
長邊組合完工長度為 4.8”並以 2 排平行列距鉚接，上排施以 MS20426AD5-6 沉頭鉚釘鉚接，下排施以 MS20470AD5-6 圓頭鉚釘鉚接。
對稱短邊組合，各邊寬為 1.5”，並施以各邊單排 D=5/32”鑽孔作業。
依圖所需之鉚釘類別與大小安排鉚接位置、畫線、沖孔、鑽孔。

五、鑽孔後將板材修毛邊。

六、以正確之鉚釘規格與手工具，進行鋁合金板之固定與鉚合。

七、完工後請在工件上簽名，並向裁判報告，同時將工作單繳交裁判人員。

八、經裁判委員確認無誤並獲得同意後，將工具恢復原狀、清點工具並清理工作現場。

九、附圖所示之圖示，僅供參考，請依維修手冊之條件自行計算正確數據及安排鉚釘間距， 並執行鋁合金板之接合作業。

附圖 1

材料厚度：0.063"

彎折半徑：0.2"(R5)

彎曲角度：90°

鉚釘: AD5-6

鑽孔: 5/32”

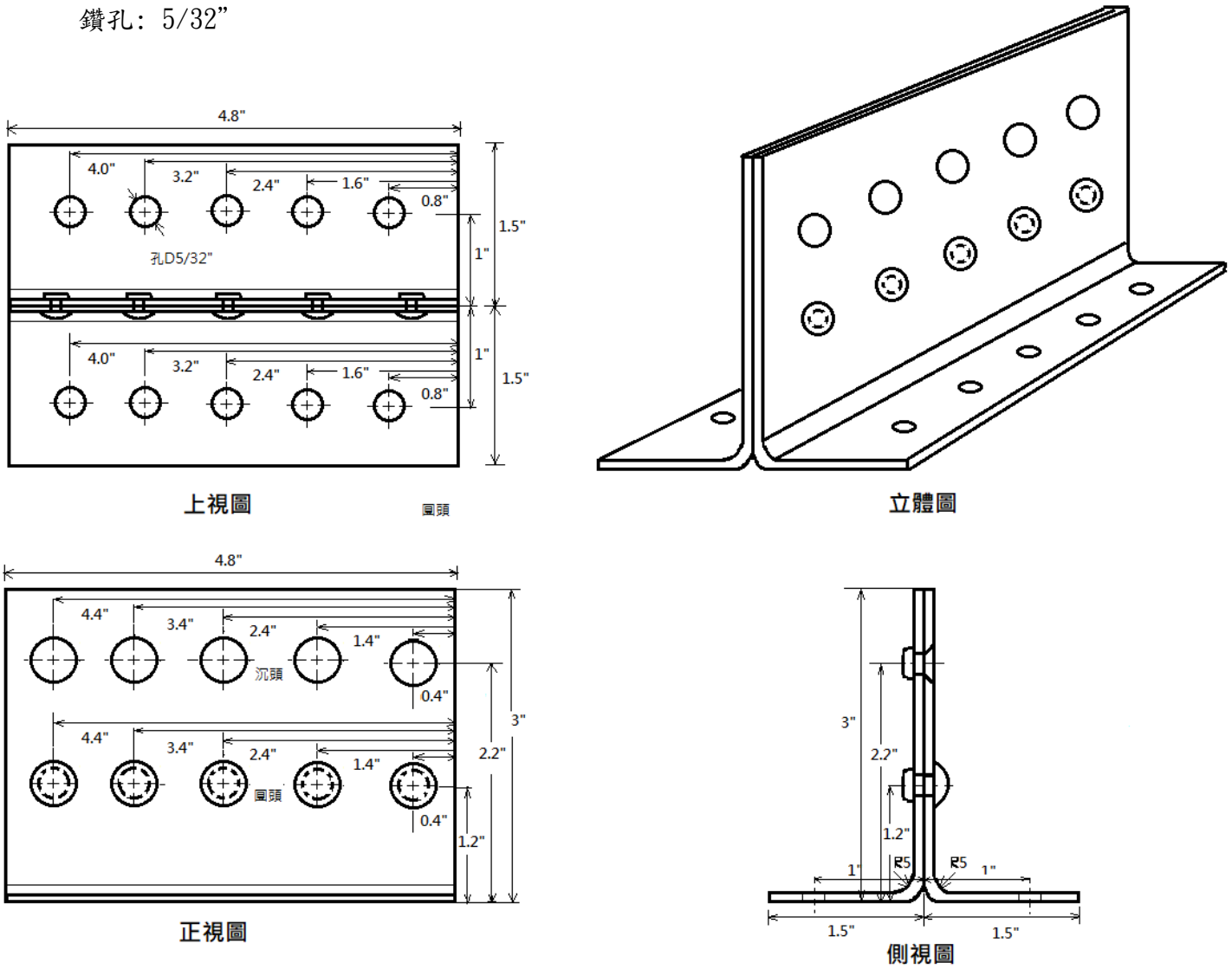


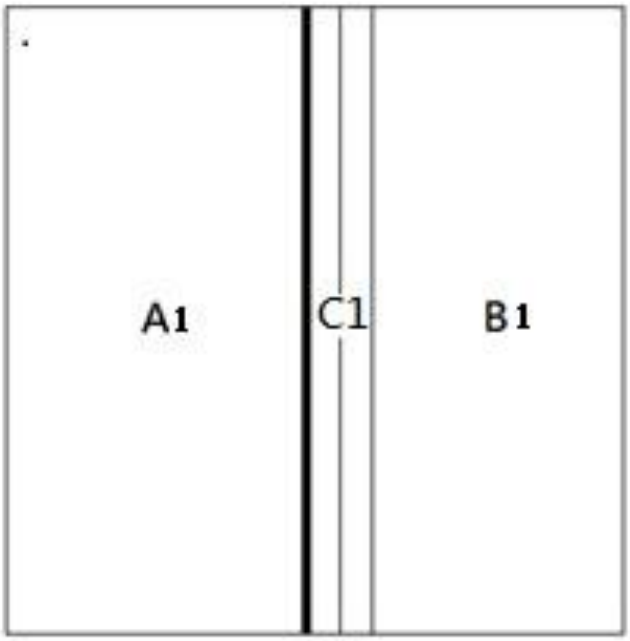
圖 1 金屬補片三視圖

展開加工圖計算

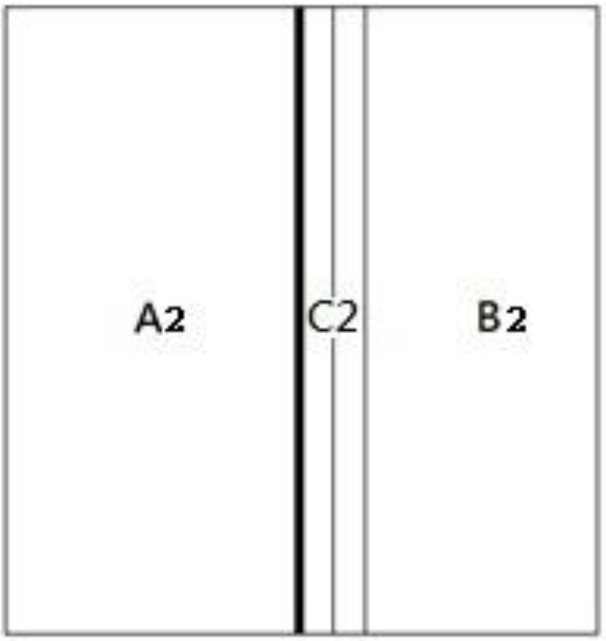
材料厚度：0.063"

彎折半徑：0.5"

彎曲角度：90°



左側鋁板



右側鋁板

平面佈置計算：

兩側鋁板 A1,A2：_____

兩側鋁板 B1,B2：_____

兩側彎折裕留 C1,C2：_____

兩側各所需料長：_____

圖二、平面佈置計算圖

彎折裕度表

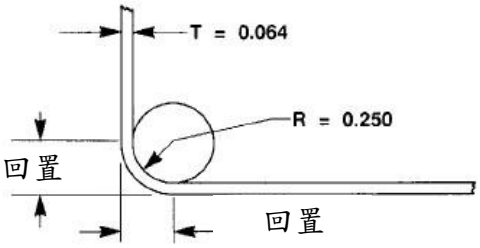
折彎半徑		材料厚度							
		0.012	0.016	0.020	0.025	0.032	0.040	0.050	0.063
0.03125	(1/32)	0.00065	0.00068	0.00072	0.00076	0.00082	0.00089	0.00099	0.00110
0.0625	(1/16)	0.00120	0.00123	0.00126	0.00131	0.00137	0.00145	0.00153	0.00165
0.09375	(3/32)	0.00174	0.00178	0.00181	0.00185	0.00191	0.00198	0.00208	0.00219
0.125	(4/32)	0.00229	0.00232	0.00235	0.00240	0.00246	0.00253	0.00262	0.00274
0.15625	(5/32)	0.00283	0.00286	0.00290	0.00294	0.00300	0.00307	0.00317	0.00328
0.1875	(3/16)	0.00338	0.00341	0.00345	0.00349	0.00355	0.00362	0.00372	0.00383
0.200	(1/5)	0.00359	0.00363	0.00366	0.00371	0.00377	0.00384	0.00393	0.00404
0.21875	(7/32)	0.00392	0.00396	0.00400	0.00404	0.00410	0.00417	0.00426	0.00438
0.250	(1/4)	0.00447	0.00450	0.00454	0.00458	0.00464	0.00471	0.00481	0.00492
0.29125	(9/32)	0.00501	0.00505	0.00508	0.00513	0.00519	0.00526	0.00535	0.00547
0.3125	(5/16)	0.00556	0.00559	0.00563	0.00567	0.00573	0.00580	0.00590	0.00601
0.34375	(11/32)	0.00610	0.00614	0.00617	0.00622	0.00628	0.00635	0.00644	0.00656
0.375	(3/8)	0.00665	0.00669	0.00672	0.00677	0.00683	0.00690	0.00699	0.00711
0.40625	(13/32)	0.00719	0.00723	0.00726	0.00731	0.00737	0.00744	0.00753	0.00765
0.4375	(7/16)	0.00774	0.00778	0.00781	0.00786	0.00792	0.00799	0.00808	0.00820
0.46875	(15/32)	0.00828	0.00832	0.00835	0.00840	0.00846	0.00853	0.00862	0.00874
0.500	(1/2)	0.00883	0.00887	0.00890	0.00895	0.00901	0.00908	0.00917	0.00929
0.53125	(17/32)	0.00937	0.00941	0.00944	0.00949	0.00955	0.00962	0.00971	0.00983
0.5625	(9/16)	0.00992	0.00996	0.00999	0.01004	0.01010	0.01017	0.01026	0.01038
0.59375	(19/32)	0.01047	0.01051	0.01054	0.01059	0.01065	0.01072	0.01081	0.01093
0.625	(5/8)	0.01101	0.01105	0.01108	0.01113	0.01119	0.01126	0.01135	0.01147
0.65625	(21/32)	0.01156	0.01160	0.01163	0.01168	0.01174	0.01181	0.01190	0.01202
0.6875	(11/16)	0.01210	0.01214	0.01217	0.01222	0.01228	0.01235	0.01244	0.01256
0.71875	(23/32)	0.01264	0.01268	0.01271	0.01276	0.01282	0.01289	0.01298	0.01310
0.750	(3/4)	0.01320	0.01324	0.01327	0.01332	0.01338	0.01345	0.01354	0.01366
0.78125	(25/32)	0.01374	0.01378	0.01381	0.01386	0.01392	0.01399	0.01408	0.01420
0.8125	(13/16)	0.01428	0.01432	0.01435	0.01440	0.01446	0.01453	0.01462	0.01474
0.84375	(27/32)	0.01482	0.01486	0.01489	0.01494	0.01500	0.01507	0.01516	0.01528
0.875	(7/8)	0.01537	0.01541	0.01544	0.01549	0.01555	0.01562	0.01571	0.01583
0.90625	(29/32)	0.01592	0.01596	0.01599	0.01604	0.01610	0.01617	0.01626	0.01638
0.9375	(15/16)	0.01648	0.01652	0.01655	0.01660	0.01666	0.01673	0.01682	0.01694
0.96875	(31/32)	0.01701	0.01705	0.01708	0.01713	0.01719	0.01726	0.01735	0.01747
1.0		0.01757	0.01761	0.01764	0.01769	0.01775	0.01782	0.01791	0.01803

K 係數表

角度[度]	K 值	角度[度]	K 值	角度[度]	K 值	角度[度]	K 值
1	0.00873	46	0.42447	91	1.0176	136	2.4751
2	0.01745	47	0.43481	92	1.0355	137	2.5386
3	0.02618	48	0.44523	93	1.0538	138	2.6051
4	0.03492	49	0.45573	94	1.0724	139	2.6746
5	0.04366	50	0.46631	95	1.0913	140	2.7475
6	0.05241	51	0.47697	96	1.1106	141	2.8239
7	0.06116	52	0.48773	97	1.1303	142	2.9042
8	0.06993	53	0.49858	98	1.1504	143	2.9887
9	0.07870	54	0.50952	99	1.1708	144	3.0777
10	0.08749	55	0.52057	100	1.1917	145	3.1716
11	0.09629	56	0.53171	101	1.2131	146	3.2708
12	0.10510	57	0.54295	102	1.2349	147	3.3759
13	0.11393	58	0.55431	103	1.2572	148	3.4874
14	0.12278	59	0.56577	104	1.2799	149	3.6059
15	0.13165	60	0.57735	105	1.3032	150	3.7320
16	0.14054	61	0.58904	106	1.3270	151	3.8667
17	0.14945	62	0.60086	107	1.3514	152	4.0108
18	0.15838	63	0.61280	108	1.3764	153	4.1653
19	0.16734	64	0.62487	109	1.4019	154	4.3315
20	0.17633	65	0.63707	110	1.4281	155	4.5107
21	0.18534	66	0.64941	111	1.4550	156	4.7046
22	0.19438	67	0.66188	112	1.4826	157	4.9151
23	0.20345	68	0.67451	113	1.5108	158	5.1455
24	0.21256	69	0.68728	114	1.5399	159	5.3995
25	0.22169	70	0.70021	115	1.5697	160	5.6713
26	0.23087	71	0.71329	116	1.6003	161	5.9758
27	0.24008	72	0.72654	117	1.6318	162	6.3137
28	0.24933	73	0.73996	118	1.6643	163	6.6911
29	0.25862	74	0.75355	119	1.6977	164	7.1154
30	0.26795	75	0.76733	120	1.7320	165	7.5957
31	0.27732	76	0.78128	121	1.7675	166	8.1443
32	0.28674	77	0.79543	122	1.8040	167	8.7769
33	0.29621	78	0.80978	123	1.8418	168	9.5144
34	0.30573	79	0.82434	124	1.8807	169	10.385
35	0.31530	80	0.83910	125	1.9210	170	11.430
36	0.32492	81	0.85408	126	1.9625	171	12.706
37	0.33459	82	0.86929	127	2.0057	172	14.301
38	0.34433	83	0.88472	128	2.0503	173	16.350
39	0.35412	84	0.90040	129	2.0965	174	19.081
40	0.36397	85	0.91633	130	2.1445	175	22.904
41	0.37388	86	0.93251	131	2.1943	176	26.636
42	0.38386	87	0.94890	132	2.2460	177	38.138
43	0.39391	88	0.96569	133	2.2998	178	57.290
44	0.40403	89	0.98270	134	2.3558	179	114.590
45	0.41421	90	1.0000	135	2.4142	180	無限

【僅供競賽參考】

彎曲半徑回置方法

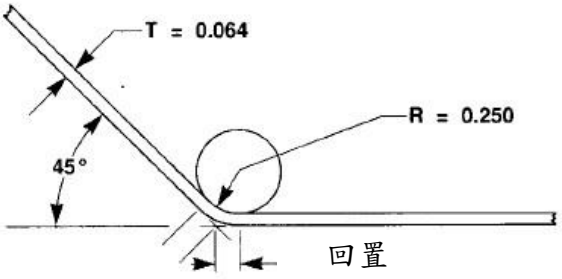


此為一 90 度角

回置=（BR+MT）K

=0.250+0.064

=0.314 吋

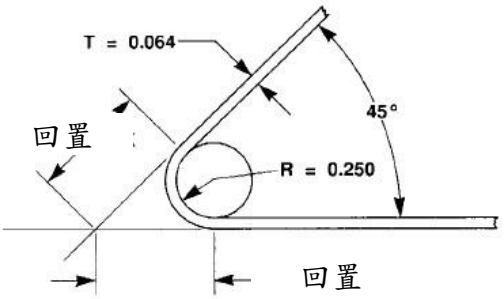


此為一 135 度開口角，金屬僅彎曲 45 度

回置=（BR+MT）K

=（0.250+0.064）0.41421

=0.130 吋



此為一 45 度閉合角

回置=（BR+MT）K

=（0.250+0.064）2.4142

=0.758 吋

第 52 屆全國技能競賽

競賽試題及說明

職類名稱：飛機修護職類　　**共 5 頁第 1 頁**

第五站　飛機 360 度檢查

（註：本公開試題在競賽時得約有百分之三十之調整）

一、題目：飛機 360 度檢查

二、說明：飛機360度檢查【含排除故障點及滑油檢測】。

1. UH1-1h 飛機飛行前、中、後檢查之範圍包含廣泛規定詳細，以實際考場飛機為測試標準， 之通用360度檢查為主要實作測驗範圍，全程均以現場位置敘述列入評分標準。
2. 參賽選手以實際現場飛機用正確程序進行飛機360度檢查之說明，裁判人員並設置檢查項目缺失四處，使參賽選手需具備故障排除之技能，並予以適當之評分。
3. 飛機滑油檢查，以實作方式執行之。
4. 依據現場裁判人員給定之資料進行答題。
5. 工作完畢，清點裝備並清理工作現場。

三、評審要點：

(一)完成時限：30分鐘。

(二)技能標準：

1. 飛機360度檢查前之準備動作，應先執行工作前之「安全確認」。
2. 依檢查卡選擇適當裝備，以正確方法操作，並能準確進行各項檢查工作。
3. 能正確執行各項工作並確實執行各項安全注意事項及防護措施。
4. 按技令規定詳加檢視飛機滑油檢查，以確定是否有不正常之滑油存量。

(三)工作安全與態度：

1. 裝備使用是否熟練。
2. 工作安全是否注意。
3. 裝備使用前後之檢查與清點。
4. 工作現場之環境清潔保持與整理。
5. 工作態度認真良好。

第 52 屆全國技能競賽

試題工作單

職類名稱：飛機修護職類

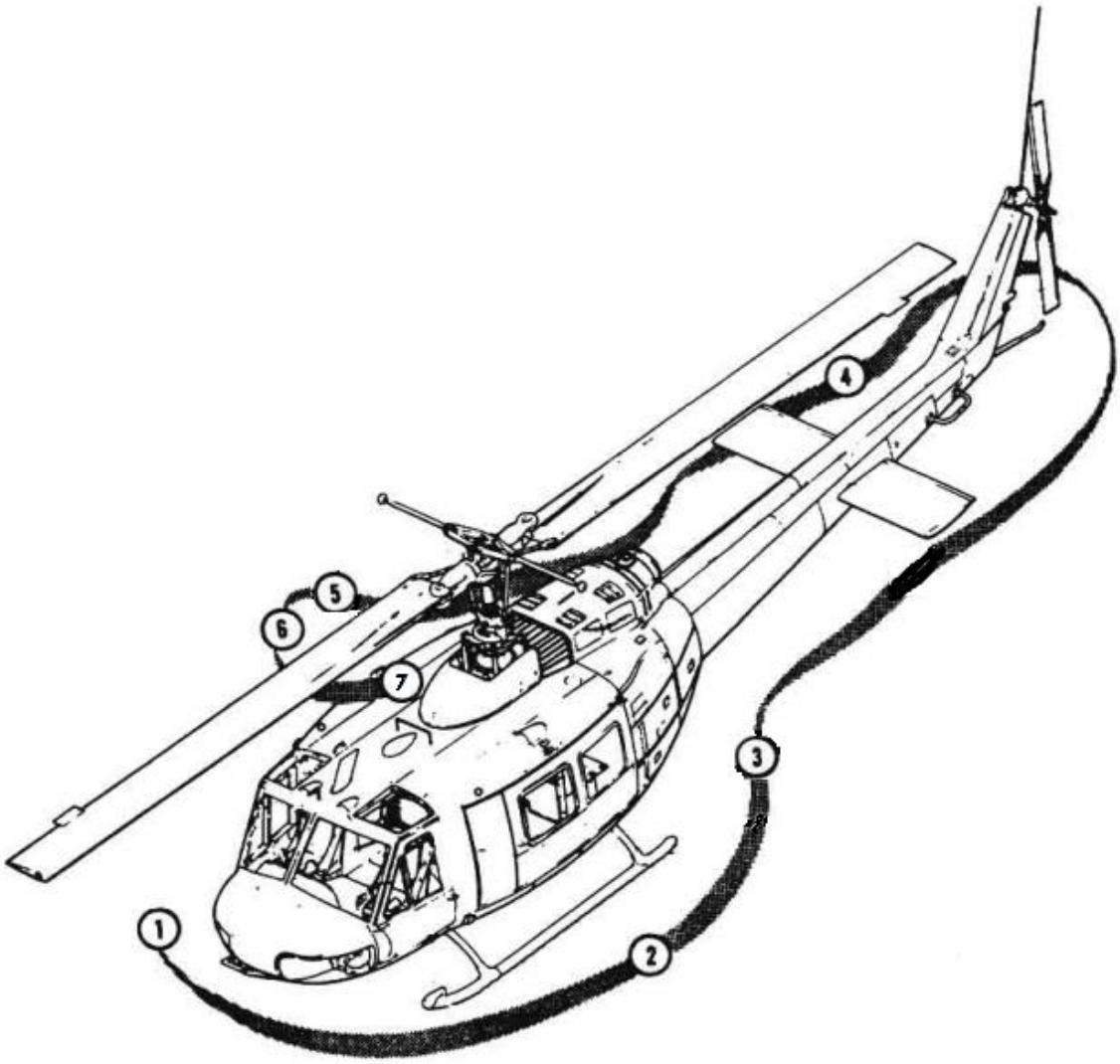
第五站　飛機 360 度檢查

題目：飛機 360 度檢查

選手編號：_____　　選手姓名：_____

測驗時間：30 分鐘　　開始時間：____ 時____分，　結束時間：_____時_____分

說明: 一、　飛機360度檢查，如下圖範例(依檢查卡項目全機逐項檢查)



圖二、 飛機檢查流程圖

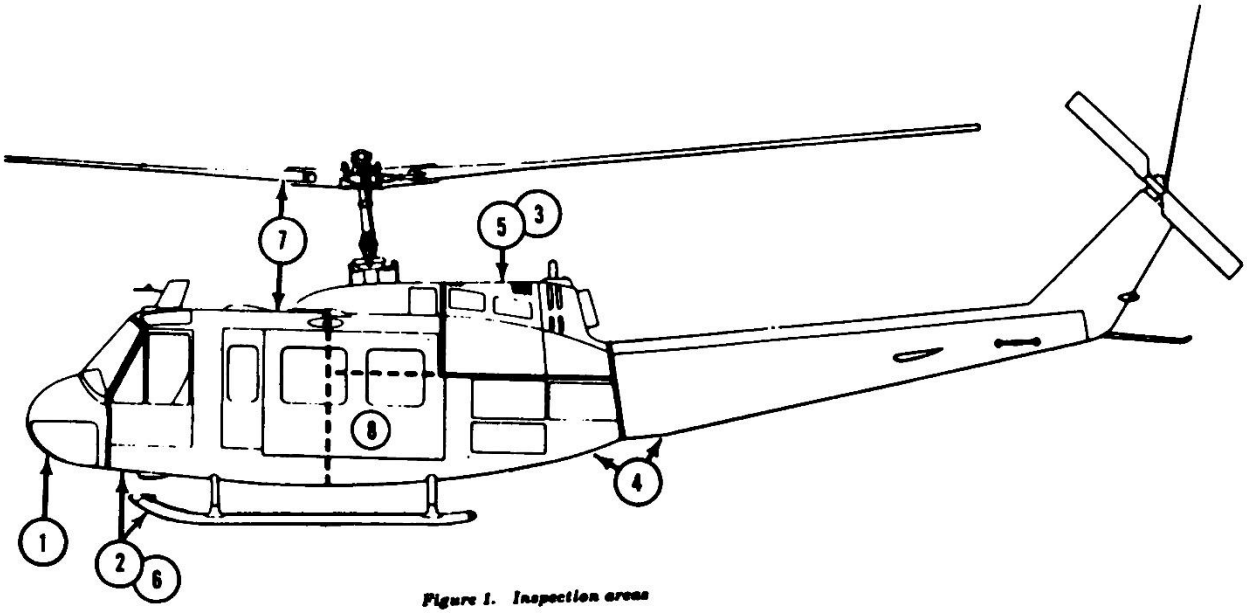


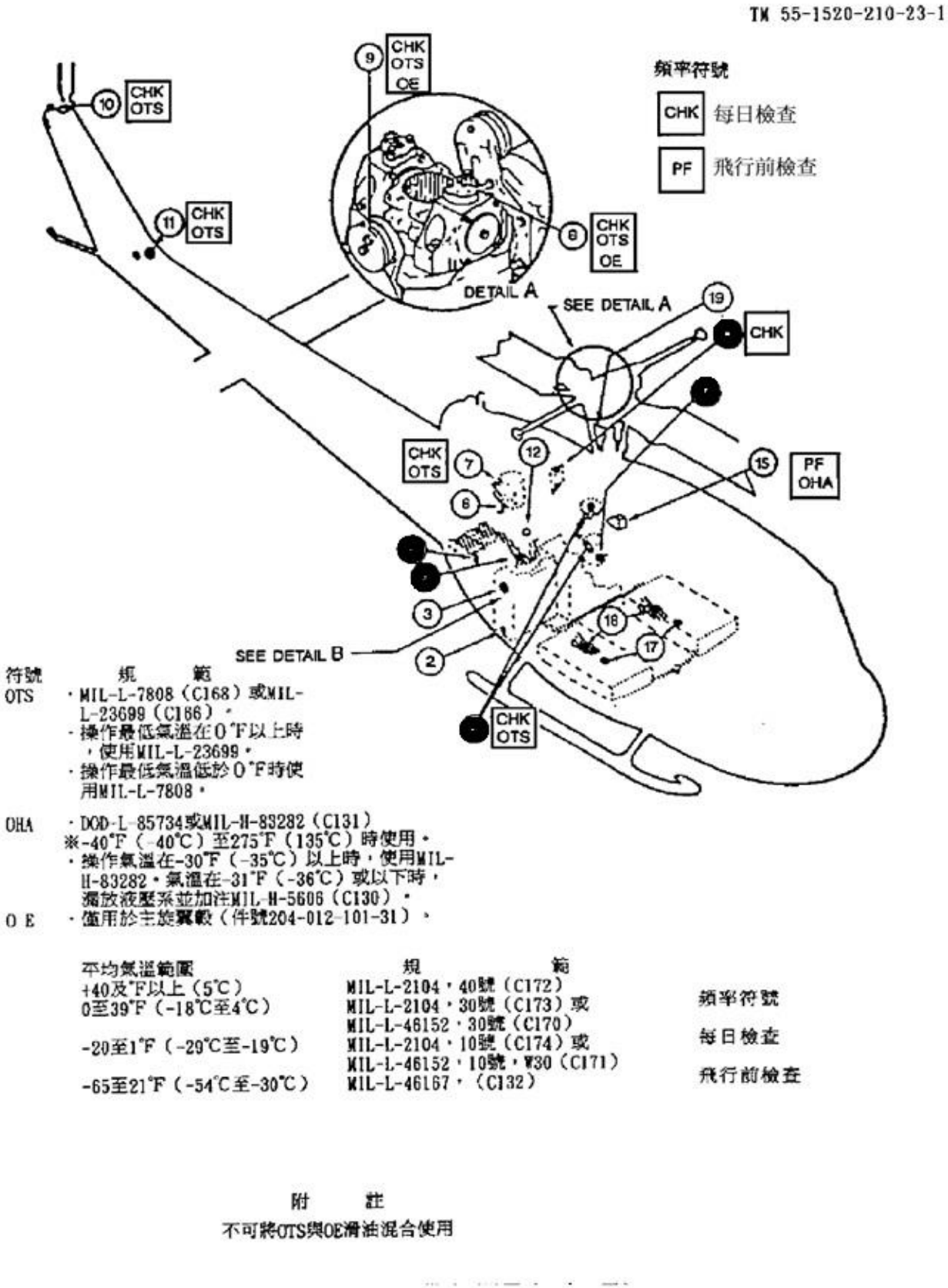
Figure 1. Inspection areas

TM 55-1520-210-PMD

Area No. 1	**Nose Area**	**All surfaces, components, and equipment in nose compartment and on exterior ahead of crew doors.**
Area No. 2	**Cabin Exterior and Landing Gear Left Side**	**All surfaces, components, and equipment on cabin exterior and underside between forward sides of crew doors and aft cabin walls. Includes landing gear, and forward fuel cell sump on cabin underside. Includes compartment in pylon island below main transmission.**
Area No. 3	**Engine Area Left Side**	**All surfaces, components, and equipment associated with engine installation, located above engine work deck and within engine cowling, tailpipe fairing and intake fairing.**
Area No. 4	**Tailboom Area**	**All surfaces, components and equipment located in or on the tailboom and vertical fin. Including access compartments below engine work deck and aft of cabin walls.**
Area No. 5	**Engine Area Right Side**	**All surfaces, components, and equipment associated with engine installation, located above engine work deck and within engine cowling, tailpipe fairing and intake fairing.**
Area No. 6	**Cabin Exterior and Landing Gear Right Side**	**All surfaces, components, and equipment on cabin exterior and underside between forward sides of crew doors and aft cabin walls. Includes landing gear, and forward fuel cell sumps on cabin underside. Includes compartment in pylon island below main transmission.**
Area No. 7	**Upper Pylon Area**	**All surfaces, components, and equipment of the main rotor pylon group, from top of mast to the bottom of the transmission mounts. Includes main rotor, mast and rotating controls, transmission with accessories and mounts, and main (input) drive shaft. Includes top of cabin surface and components.**

圖二、 飛機檢查站位對照圖

二、 依據 TM 55-1520-210-23-1 手冊圖表，執行 UH-1h 飛機滑油每日檢查。



圖三、 飛機滑油檢查位置圖

第 52 屆全國技能競賽
試題工作單

職類名稱：飛機修護職類

第五站飛機360度檢查工作單

一、飛機 360度檢查項目部分:（25 分）

二、請列出飛機360度檢查發現之故障處：(25 分）

1. _____。
2. _____。
3. _____。
4. _____。

三、查閱TM 55-1520-210-23-1手冊圖表，執行UH-1h飛機滑油每日檢查。（15分）

1. 檢查發現之缺失處：(15 分)

四、請查出 AN593-6 鋁合金液壓管路接頭扭力磅數。(5 分)
若主旋翼穀須加注什麼型號黃油。(5 分)

四、工作完畢報告裁判，並將工作單交回，清點工具及工作區域。(10 分）