

(19) World Intellectual Property Organization
International Bureau(43) International Publication Date
27 December 2007 (27.12.2007)

PCT

(10) International Publication Number
WO 2007/149296 A2(51) International Patent Classification:
G06F 19/00 (2006.01) **G06F 17/40** (2006.01)(21) International Application Number:
PCT/US2007/013958

(22) International Filing Date: 13 June 2007 (13.06.2007)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
11/454,466 16 June 2006 (16.06.2006) US(71) Applicant (for all designated States except US): **SIKORSKY AIRCRAFT CORPORATION** [US/US]; Legal-iP Dept., Mail Stop S316a, 6900 Main Street, Stratford, CT 06615-9129 (US).

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(81) Designated States (unless otherwise indicated, for every kind of national protection available): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BH, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IS, JP, KE, KG, KM, KN, KP, KR, KZ, LA, LC, LK, LR, LS, LT, LU, LY, MA, MD, ME, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RS, RU, SC, SD, SE, SG, SK, SL, SM, SV, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA, ZM, ZW.

(84) Designated States (unless otherwise indicated, for every kind of regional protection available): ARIPO (BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IS, IT, LT, LU, LV, MC, MT, NL, PL,

[Continued on next page]

(54) Title: SUPPLIER TEARDOWN AND ANALYSIS REPORTING SYSTEM

Sikorsky Aircraft Supplier Teardown and Analysis Report																																																												
Part Nomenclature: Spindle Subassy		PO Number: 12345		Report No: 1																																																								
Part Number: 70102-08200-056		Supplier Part No: SP-12345		Report Date: 6/6/2005																																																								
Part Serial Number: ABC-1234		Supplier Name: Engineering Fabrics		Removal Malfunction Description																																																								
Removal Date: 6/6/2004		Supplier Code: 78256		PITTED																																																								
TSN: 345	TSR: 145	Failure Location: Jacksonville, Florida	A/C Model: SH-60B	A/C Serial No: 12345																																																								
Reported Discrepancy Spindle rejected due to pitted/worn threads																																																												
Rejection confirmed? YES		Part Dispositioned: REPAIR		Previous Occurrence(s): NO If Yes, reference previous report no:																																																								
Failure Analysis Description Spindle reject rate has increased from 20% to 50% due to thread "damage". Investigations found that some of rejected spindles were caused by an incomplete cleaning of the dry film lubricant.																																																												
Root Cause Description End Item Root Cause Failure Mode: CONTAMINATION - nonmetallic The spindle assembly, which is shown in Figure 1 (Ref. Supporting Documents / Pictures; Record 1) attaches the rotor blade assembly to the main rotor hub assembly. The spindle assembly comprises mainly the spindle subassembly and the spherical & thrust elastomeric bearings, which take the bending and twisting movements of the rotor blade. Discussions with shop mechanics revealed that the spindle fail out rate has increased from 20% to 50% due to thread damage. Further investigations found that some of rejected spindles were caused by an incomplete cleaning of the dry film lubricant from the spindle threads.																																																												
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<table border="1"><thead><tr><th>Part Number</th><th>Part Nomenclature</th><th>Cause</th><th>Disposition</th><th>QTY</th></tr></thead><tbody><tr><td>70102-08201-156</td><td>Spindle</td><td>Damage</td><td>Scrap</td><td>1</td></tr><tr><td>2</td><td></td><td></td><td></td><td></td></tr><tr><td>3</td><td></td><td></td><td></td><td></td></tr><tr><td>4</td><td></td><td></td><td></td><td></td></tr><tr><td>5</td><td></td><td></td><td></td><td></td></tr><tr><td>6</td><td></td><td></td><td></td><td></td></tr><tr><td>7</td><td></td><td></td><td></td><td></td></tr><tr><td>8</td><td></td><td></td><td></td><td></td></tr><tr><td>9</td><td></td><td></td><td></td><td></td></tr><tr><td>10</td><td></td><td></td><td></td><td></td></tr></tbody></table>						Part Number	Part Nomenclature	Cause	Disposition	QTY	70102-08201-156	Spindle	Damage	Scrap	1	2					3					4					5					6					7					8					9					10				
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Work Performed by: John Johnson		Report Written by: John Johnson		Title: Technician																																																								
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(57) Abstract: A Supplier Teardown and Analysis Reporting System (STARS) captures information pertaining to component removals or failures that caused an unscheduled maintenance action. The detailed data facilitates design engineers understanding of failure drivers and propose improvements and commence implementation of a Corrective Action Plan at the earliest practicable time.



PT, RO, SE, SI, SK, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

Published:

— *without international search report and to be republished upon receipt of that report*

SUPPLIER TEARDOWN & ANALYSIS REPORTING SYSTEM

BACKGROUND OF THE INVENTION

[0001] This invention was made with government support under Contract No.:N00383-04-D-028N with the United States Navy. The government therefore has certain rights in this invention.

[0002] The present invention relates to an integrated system and method for tracking component repairs, and more particularly to a system and method used to document the reported discrepancy, failure analysis, root cause and proposed corrective action(s) for nonconforming components.

[0003] Currently, information pertaining to a component or system removal or failure that caused an unscheduled maintenance event may or may not be retained by the repair facility. However, even if retained at the repair facility, the information is not transmitted back to the OEM or customer who first sent the component or system out for repair. That is, the OEM or customer who sent out the defective component or system will receive a repaired or replacement component or system without a detailed description of the failure or repair that was performed at the repair facility.

[0004] Although effective, the lack of a detailed description of the failure or repair that was performed at the repair facility prevents an OEM or customer from centralizing the reliability performance database, trending the information to identify potential fleet impact or from utilizing the data as a basis to explore potential continued improvements.

[0005] Accordingly, it is desirable to provide an integrated system and a method for tracking component repairs which facilitates failure analysis for determination of root cause and proposed corrective action(s).

SUMMARY OF THE INVENTION

[0006] The integrated tracking system according to the present invention provides a Supplier Teardown and Analysis Reporting System (STARS) which captures information pertaining to component removals or failures that caused an unscheduled maintenance action. The detailed data facilitates design engineer understanding of the failure drivers to propose

improvements and commence implementation of a Corrective Action Plan at the earliest practicable time.

[0007] The present invention therefore provides an integrated system and a method for tracking component repairs which facilitates failure analysis for determination of root cause and proposed corrective action(s).

BRIEF DESCRIPTION OF THE DRAWINGS

[0008] The various features and advantages of this invention will become apparent to those skilled in the art from the following detailed description of the currently preferred embodiment. The drawings that accompany the detailed description can be briefly described as follows:

[0009] Figure 1 is a schematic block diagram of a supplier teardown and analysis reporting system;

[0010] Figure 2 is a screen shot from the supplier teardown and analysis reporting system utilizing a spindle assembly as an example component repair;

[0011] Figure 3A is a perspective view of the spindle assembly described in the screen shot illustrated in Figure 2;

[0012] Figure 3B is an exploded view of a root cause description of the example spindle assembly; and

[0013] Figure 4 is an example of a supplier teardown and analysis report generated from the supplier teardown and analysis reporting system as would be generated from the information input at Figure 2.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

[0014] Figure 1 illustrates an integrated tracking system 20 for tracking repaired components or systems in a block diagram format. The system 20 interconnects any number of repair facility FTP sites 22a-22n with an aircraft OEM file server 24 through a communication system 26 such as the Internet, email, or any suitable transfer or downloading technique known in the art. Each repair facility is typically a remote location such as various repair facility sites, supplier sites, and company business unit sites. It should be understood that repair facility as utilized herein may include any facility which receives components or

systems from the OEM or the fleet. That is, a typical "black box" component or system is typically removed from the aircraft and returned to the OEM or designated repair facility. Once repaired, the component or system was heretofore returned to the original operator for immediate use or entry into maintenance stores for later use.

[0015] The aircraft OEM filer server 24 includes a centralized component repair information database 28. The centralized component repair information database 28 is referred to herein as a Supplier Teardown and Analysis Reporting System (STARS).

[0016] Information about repaired components or systems is entered at the repair facility FTP sites 22a-22n. Data within the repair facility FTP sites 22a-22n about the repaired components or systems is communicated from each of the aforementioned locations to the aircraft OEM 24. It should be understood that various server systems will also be usable with the present invention and that the illustrated embodiment of server systems are for descriptive purposed only. The data typically includes information pertaining to component removals or failures that caused an unscheduled maintenance as well as other information as disclosed in the screen shot (Figure 2) of the illustrated embodiment which utilizes a spindle assembly (Figures 3A and 3B) as an example component which has been sent out to a repair facility. The database 28 may be programmed in any suitable computer language such as Microsoft Access or the like generally known in the art to carry out the herein described functionality.

[0017] Referring to Figure 2, the data entry screen allows the repair facility to enter or update data in the system and to navigate through database records via the action command buttons located on the right of the screen. Most of the data fields are self-explanatory. The description and data type for each field are provided in the Appendix. Some data fields have a drop-down feature for quicker and easier data entry. Drop-down lists also help to ensure that the data that is entered in a field is consistent.

[0018] The data entry screen is preferably divided into the following sections:

[0019] UPPER SECTION (FAILED COMPONENT INFORMATION)

[0020] This section of the screen contains general information about the specific failed component that is returned to supplier for teardown and/or failure evaluation. It is preferably a mandatory requirement to create a new record for each returned component. When a new record is added to the system to document activities performed on a particular failed component, a record number will be assigned to the TAR Number data field. Data type

for the TAR Number is an AutoNumber field that automatically enters a number when a record is added. Preferably, once a record number is generated, it can't be deleted or changed.

[0021] The repair facility is encouraged to record information from paper documentations that are returned along with the failed component. Field information such as: TSN (Time Since New), TSR (Time Since Repair), and Removal Malfunction etc. can be very useful during the component investigation.

[0022] MIDDLE SECTION (ROOT CAUSE ANALYSIS AND CORRECTIVE ACTION)

[0023] The primary purpose of the STARS 20 is to capture information pertaining to component removals or failures that caused an unscheduled maintenance action. Therefore, detailed data information provided in this section facilitates design engineer understanding of the failure drivers to propose improvements and commence implementation of a Corrective Action Plan at the earliest practicable time. Definitions for some of data fields in this section are as follow:

[0024] - Failure Analysis Description: Description of how the root cause of the reported problem was determined. The repair facility shall perform a failure analysis on all: (i) in-house or reported failures; and (ii) reported unscheduled maintenance actions when either a failure trend is established ("Failure Trend") or flight safety is involved (collectively or individual "Failure"). A Failure Trend shall be defined as the establishment of two or more occurrences of the identical unscheduled maintenance event/failure symptom.

[0025] - Root Cause: Identify the root cause of the failure with substantiating data such as photos, drawings, op-sheets, test and met - lab reports, inspection results and measurements, and analyses which identify the root cause and link it to the Reported Discrepancy.

[0026] - Proposed Corrective Action: Identify the corrective action that specifically addresses the identified root cause. Substantiate that the corrective action is cost effective in addressing the cause. (E.g. A special inspection may address symptoms and identify that a problem has occurred, but may not be cost effectively in preventing the root cause from reoccurring).

[0027] LEFT BOTTOM SECTION (SUPPORTING DOCUMENTS/PICTURES)

[0028] This section of the screen permits photos, documents, presentations and the like that support the failure analysis, root cause and corrective action entries.

[0029] RIGHT BOTTOM SECTION (DISPOSITION OF FAILED COMPONENTS)

[0030] This section contains detail piece components or sub-assemblies that may contribute to the reported failure. For example only, an electronic system that has several Circuit Card Assemblies (CCAs) may be removed from an aircraft due to a reported "Internal Failure." During the subsequent teardown/testing process at the repair facility, some CCAs were found inoperable due to corrosion, fatigue, shorts, etc. The repair facility should enter information about individual CCAs in this section.

[0031] Once data is input into STARS, suppliers may email the MS Access data Table File ("SupplierTAR_be.mdb") and any supporting information contained in the STARS application folder ("DocumentsPictures") to an email address of the OEM. The inputted data may also be printed as a report (Figure 4) for attachment with the returned repaired components and systems or for other recordation usage.

[0032] APPENDIX

Field Name	Data Type	Field Description
TAR_Number	AutoNumber	Sequential number automatically generated by system when a new record is entered
Component_Nomenclature	Text	Assembly Name
Component_Component_Number	Text	Sikorsky assembly component number
Component_Serial_Number	Text	Sikorsky assembly serial number
Removal_Date	Date/Time	Date assembly is removed from aircraft
Failure_Location	Text	Location where aircraft is operated and assembly is removed from that aircraft
TSN	Number	Assembly operating Time Since New (Hours)
TSR	Number	Assembly Operating Time Since Repair (Hours)
Report_Date	Date/Time	Date, the TAR Number is generated
Rejection_Confirmed	Text	Indicating whether reported failure is verified (Y/N)
Component_Disposition	Text	Indicating whether returned component is scraped or repaired
PO_Number	Number	Purchase Order Number
Supplier_Name	Text	Supplier Company Name
Supplier_Component_Number	Text	Supplier Component Number If different
Supplier_Code	Text	Supplier Code
Reported_Malfunction_Description	Text	Malfunction assigned to component which was removed from aircraft

Reported_Discrepancy	Memo	Description of why component is removed
Previous_Occurences	Text	Indicating whether this type of failure mode has occurred
Reference_Previous_Reports	Text	Provide TAR Number(s) with same failure mode
Aircraft_Model	Text	Aircraft Model; SH-60B; SH-60F, MH-60R etc.
Aircraft_Serial_Number	Number	Aircraft tail number
Failure_Analysis	Memo	Description of how the root cause of the reported problem was determined
Failure_Root_Cause	Memo	Fundamental breakdown and/or failure which caused the reported unscheduled maintenance removal
Corrective_Action	Memo	Describe corrective actions implemented to correct the root cause identified
Work_Performed	Memo	Provide all steps that component is undergone from incoming testing to completion of repair
Work_Performed_By	Text	Name of shop personnel who repaired component
Report_Written_By	Text	Name of personnel who complete root cause and corrective action writing
TAR_Written_Title	Text	Title of personnel who complete root cause and corrective action writing
Report_Written_Date	Date/Time	Date, the failure analysis and report is complete
End_Item_Root_Cause_Description	Text	Provide short description of failure cause
Detailed_Component_1	Text	Component Number of detailed component
Detailed_Component_1_Nomenclature	Text	Name of detailed component
Detailed_Component_1_Cause	Text	What cause detailed component to fail
Detailed_Component_1_Disposition	Text	Detailed component disposition; scrap or repair
Detailed_Component_1_Quantity	Number	Provide Quantity
Detailed_Component_2	Text	Component Number of detailed component
Detailed_Component_2_Nomenclature	Text	Name of detailed component
Detailed_Component_2_Cause	Text	What cause detailed component to fail
Detailed_Component_2_Disposition	Text	Detailed component disposition; scrap or repair
Detailed_Component_2_Quantity	Number	Provide Quantity
Detailed_Component_3	Text	Component Number of detailed component
Detailed_Component_3_Nomenclature	Text	Name of detailed component
Detailed_Component_3_Cause	Text	What cause detailed component to fail
Detailed_Component_3_Disposition	Text	Detailed component disposition; scrap or repair
Detailed_Component_3_Quantity	Number	Provide Quantity
Detailed_Component_4	Text	Component Number of detailed component
Detailed_Component_4_Nomenclature	Text	Name of detailed component

Detailed_Component_4_Cause	Text	What cause detailed component to fail
Detailed_Component_4_Dis	Text	Detailed component disposition; scrap or repair
Detailed_Component_4_Quantity	Number	Provide Quantity
Detailed_Component_5	Text	Component Number of detailed component
Detailed_Component_5_Nomenclature	Text	Name of detailed component
Detailed_Component_5_Cause	Text	What cause detailed component to fail
Detailed_Component_5_Dis	Text	Detailed component disposition; scrap or repair
Detailed_Component_5_Quantity	Number	Provide Quantity
Detailed_Component_6	Text	Component Number of detailed component
Detailed_Component_6_Nomenclature	Text	Name of detailed component
Detailed_Component_6_Cause	Text	What cause detailed component to fail
Detailed_Component_6_Dis	Text	Detailed component disposition; scrap or repair
Detailed_Component_6_Quantity	Number	Provide Quantity
Detailed_Component_7	Text	Component Number of detailed component
Detailed_Component_7_Nomenclature	Text	Name of detailed component
Detailed_Component_7_Cause	Text	What cause detailed component to fail
Detailed_Component_7_Dis	Text	Detailed component disposition; scrap or repair
Detailed_Component_7_Quantity	Number	Provide Quantity
Detailed_Component_8	Text	Component Number of detailed component
Detailed_Component_8_Nomenclature	Text	Name of detailed component
Detailed_Component_8_Cause	Text	What cause detailed component to fail
Detailed_Component_8_Dis	Text	Detailed component disposition; scrap or repair
Detailed_Component_8_Quantity	Number	Provide Quantity
Detailed_Component_9	Text	Component Number of detailed component
Detailed_Component_9_Nomenclature	Text	Name of detailed component
Detailed_Component_9_Cause	Text	What cause detailed component to fail
Detailed_Component_9_Dis	Text	Detailed component disposition; scrap or repair
Detailed_Component_9_Quantity	Number	Provide Quantity
Detailed_Component_10	Text	Component Number of detailed component
Detailed_Component_10_Nomenclature	Text	Name of detailed component
Detailed_Component_10_Cause	Text	What cause detailed component to fail
Detailed_Component_10_Dis	Text	Detailed component disposition; scrap or repair
Detailed_Component_10_Quantity	Number	Provide Quantity

Data fields for Photo / Document Table	Data Type	Field Description
DOCID	AutoNumber	Sequential number automatically generated by system when a new record is entered
TASKID	Number	Number that links to TAR Number
Description	Text	Description of photo / document
Document	OLE Object	Photo / document to be inserted
Date entered	Date/Time	Date, the photo / document is inserted

[0033] The repair facility shall perform a failure analysis on all: (i) in-house or reported failures; and (ii) reported unscheduled maintenance actions when either a failure trend is established ("Failure Trend") or flight safety is involved (collectively or individual "Failure"). A Failure Trend shall be defined as the establishment of two or more occurrences of the identical unscheduled maintenance event / failure symptom.

[0034] Although particular step sequences are shown, described, and claimed, it should be understood that steps may be performed in any order, separated or combined unless otherwise indicated and will still benefit from the present invention.

[0035] The foregoing description is exemplary rather than defined by the limitations within. Many modifications and variations of the present invention are possible in light of the above teachings. The preferred embodiments of this invention have been disclosed, however, one of ordinary skill in the art would recognize that certain modifications would come within the scope of this invention. It is, therefore, to be understood that within the scope of the appended claims, the invention may be practiced otherwise than as specifically described. For that reason the following claims should be studied to determine the true scope and content of this invention.

CLAIMS

What is claimed is:

1. A method of tracking repaired components comprising the steps of:
 - (A) inputting data pertaining to unscheduled maintenance of a repaired component by a repair facility user;
 - (B) communicating data from said step (A) to an OEM; and
 - (C) compiling the data from said step (B) to facilitate failure analysis tracking of a multiple of the repaired components.
2. A method as recited in claim 1, further comprises the step of:
 - (D) determination a root cause from said step (C).
3. A method as recited in claim 2, further comprises the step of:
 - (E) determination a proposed corrective action from said step (D).
4. A method as recited in claim 1, wherein said step (A) further comprises the steps of:
 - (a) inputting a failure analysis description of the repaired component.
5. A method as recited in claim 1, wherein said step (A) further comprises the steps of:
 - (a) inputting a root cause of a failure of the repaired component.

6. A method as recited in claim 5, wherein said step (A) further comprises the steps of:

(b) inputting substantiating data for the root cause.

7. A method as recited in claim 6, wherein said step (A) further comprises the steps of:

(c) inputting a proposed corrective action.

8. A method as recited in claim 7, wherein said step (c) further comprises the step of:

(i) inputting substantiating data for the proposed corrective action to demonstrate that the proposed corrective action is cost effective.

9. A method as recited in claim 1, further comprises the step of:

(D) inputting data regarding related components that may contribute to the unscheduled maintenance.

10. A method of tracking repaired components comprising the steps of:

- (A) inputting data pertaining to a failure analysis from an unscheduled maintenance of a repaired component by a repair facility user;
- (B) inputting data pertaining to a root cause of the unscheduled maintenance of the repaired component by the repair facility user;
- (C) inputting data pertaining to a proposed corrective action for the root cause of said step (B) by the repair facility user;
- (D) communicating data from said steps (A-C) to an OEM; and
- (E) compiling the data at the OEM to facilitate failure analysis tracking of a multitude of the repaired components.

11. A method as recited in claim 10, wherein said step (A) further comprises the steps of:

- (a) inputting substantiating data for the failure analysis.

12. A method as recited in claim 10, wherein said step (B) further comprises the steps of:

- (a) inputting substantiating data for the root cause.

13. A method as recited in claim 10, wherein said step (C) further comprises the steps of:

- (a) inputting substantiating data for the proposed corrective action to demonstrate that the proposed corrective action is cost effective.

14. A method of tracking repaired components comprising the steps of:

(A) receiving data pertaining to a failure analysis from an unscheduled maintenance of a repaired component;

(B) receiving data pertaining to a root cause of the unscheduled maintenance of the repaired component;

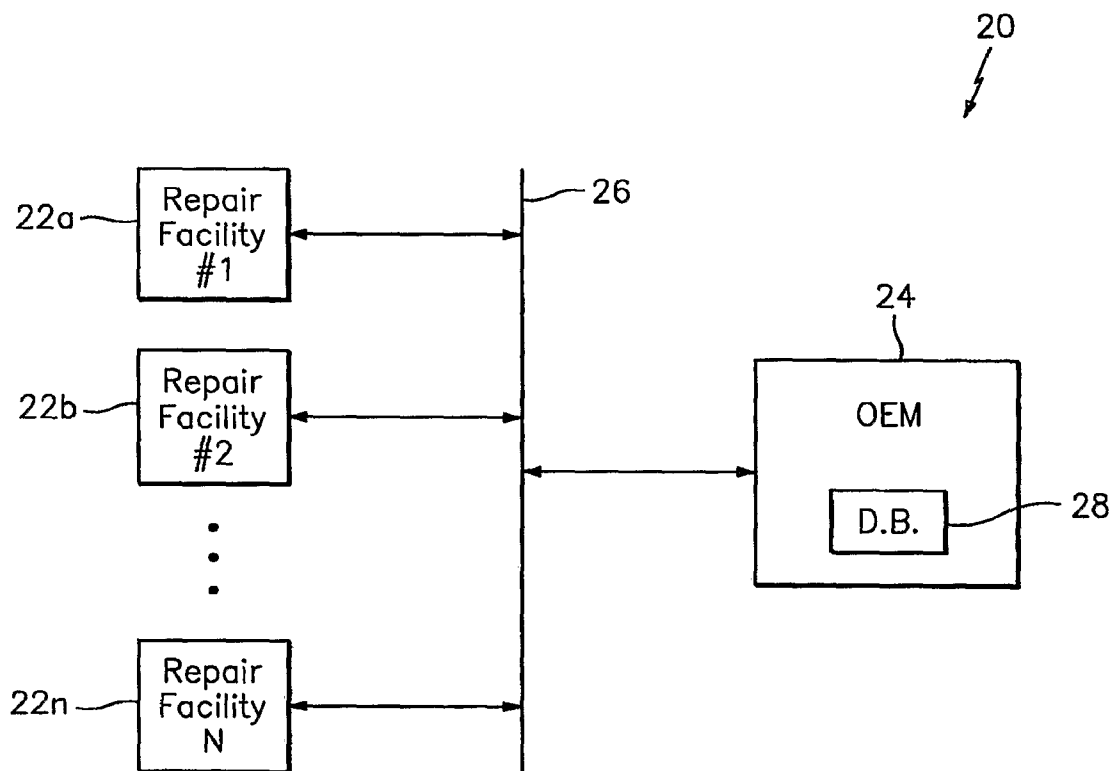
(C) receiving data pertaining to a proposed corrective action for the root cause of said step (B); and

(D) compiling the data from said steps (A-C) to facilitate failure analysis tracking of a multitude of the repaired components.

15. A method as recited in claim 1, further comprising the step of:

(E) determination a Corrective Action Plan in response to said step (D).

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*FIG. 1*

COMPONENT TEARDOWN AND ANALYSIS													
Component Nomenclature: Spindle Subassy		PO Number: 12345		TAR Number:		RECORD NAVIGATOR Find Record First Record Next Record Previous Record Last Record New Record Print This Record Back To MainMenu		Report Date: 5/6/2005					
Component Part Number: 70102-08200-056		Supplier Part Number: SP-12345		Removal Malfunction Description: PITTED									
Component Serial Number: ABC-1234		Supplier Name: Engineering Fabrics		Rejection Confirmed? ☐ YES ☒									
Component Removed Date: 6/6/2004		Supplier Code: 78256		Component Dispositioned ☐ REPAIR ☒									
TSN 345		TSR 145		Aircraft Model SH-60B		Aircraft Serial No. 12345		Failure Analysis Description					
Reported Discrepancy		Failure Location		Rejection Confirmed?		Component Dispositioned		Spindle reject rate has increased from 20% to 50% due to thread "damage". Investigations found that some of rejected spindles were caused by an incomplete cleaning of the dry film lubricant.					
Spindle rejected due to pitted/worm threads		Jacksonville, Florida		☐ YES ☒		☐ REPAIR ☒							
Previous Occurrence(s): ☐ NO ☒ YES If so; reference previous TAR Numbers:				Proposed Corrective Action									
Root Cause				The spindle assembly, which is shown in Figure 3A & 3B (Ref. Supporting Documents/Pictures; Record 1) attaches the rotor blade assembly to the main rotor hub assembly. The spindle assembly comprises mainly the spindle subassembly and the spherical & thrust elastomeric bearings, which take the bending and twisting movements of the rotor blade End Item Root Cause Description: ☐ CONTAMINATION - nonmetallic ☒									
Work Performed				Disposition of Failed Parts									
5/6/2004--There is an alternate method for cleaning threads in DMWR 1-1615-377. CCAD currently uses Plastic Media Blast (PMB). This has resulted in a high reject rate due to incomplete cleaning of threads (fails thread inspection). This				Part Number		Nomenclature		Cause		Disposition		Qty	
Supporting Documents / Pictures Double Click Icon to view Presentation				170102-08201-156		Spindle		Damage		Scrap		1	
Record: 14 1 of 4				Technician		Title		John Johnson		Report Written Date: 6/6/2005			
Work Performed by: John Johnson				Technician		Title		John Johnson		Report Written Date: 6/6/2005			

FIG. 2

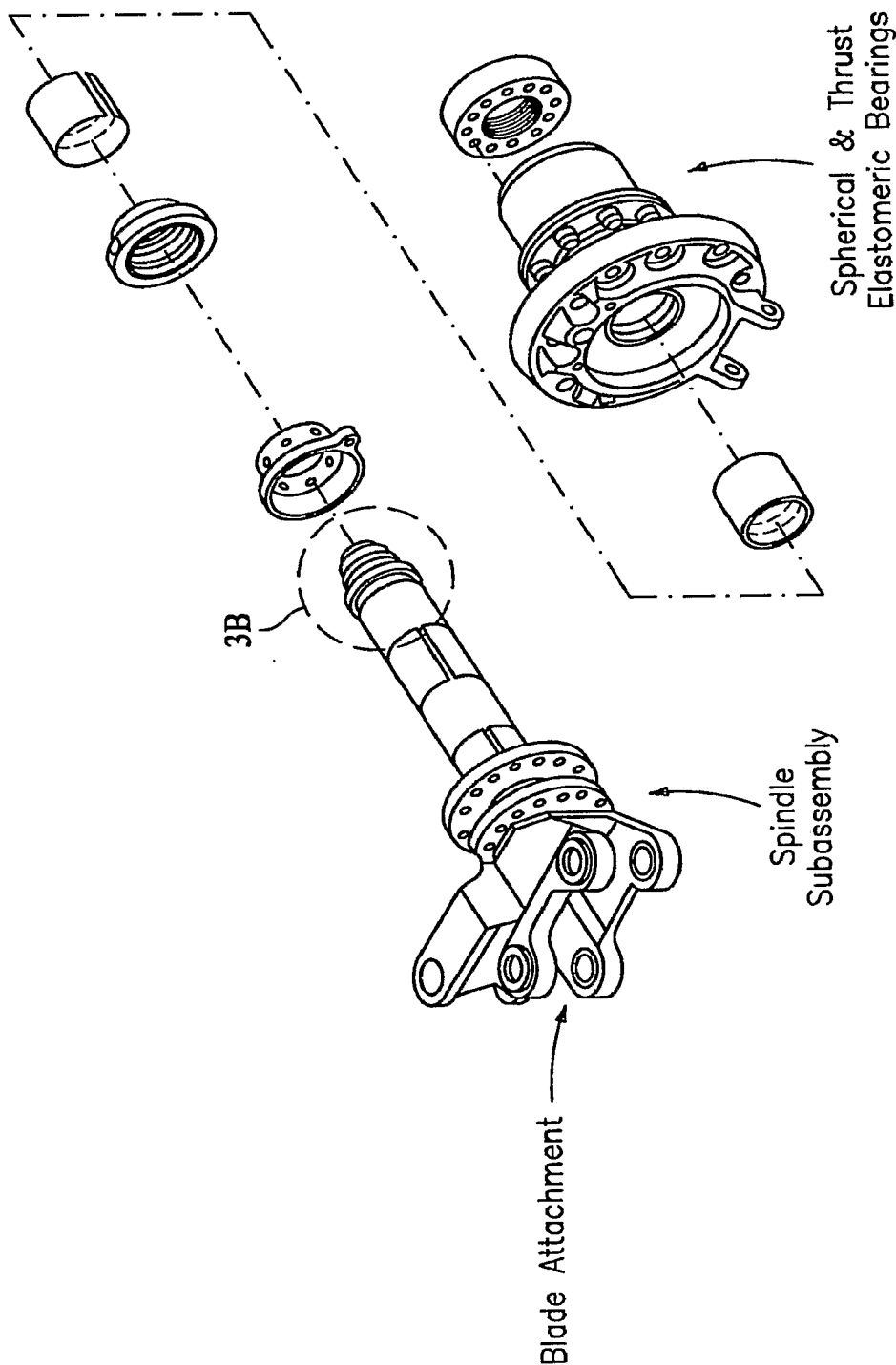


FIG. 3A

4/5

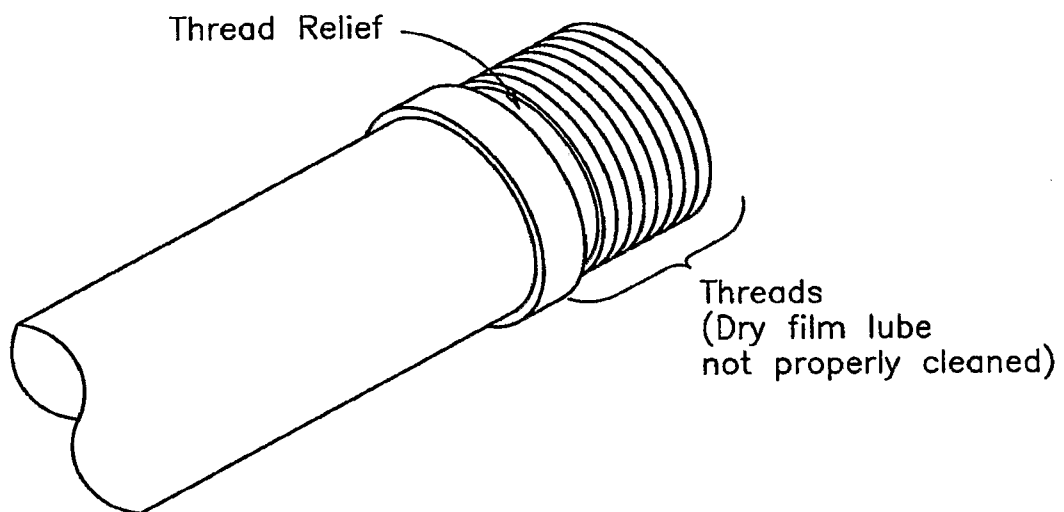


FIG. 3B

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Sikorsky Aircraft Supplier Teardown and Analysis Report																																																																												
<u>Part Nomenclature:</u> Spindle Subassy <u>Part Number:</u> 70102-08200-056 <u>Part Serial Number:</u> ABC-1234 <u>Removal Date:</u> 6/6/2004		<u>PO Number:</u> 12345 <u>Supplier Part No:</u> SP-12345 <u>Supplier Name:</u> Engineering Fabrics <u>Supplier Code:</u> 78256		<u>Report No:</u> 1 <u>Report Date:</u> 6/6/2005 <u>Removal Malfunction Description:</u> PITTED																																																																								
<u>TSN:</u> 345	<u>TSR:</u> 145	<u>Failure Location:</u> Jacksonville, Florida	<u>A/C Model:</u> SH-60B	<u>A/C Serial No:</u> 12345																																																																								
<u>Reported Discrepancy</u> Spindle rejected due to pitted/worn threads																																																																												
<u>Rejection confirmed?</u> YES		<u>Part Dispositioned:</u> REPAIR		<u>Previous Occurrence(s):</u> NO <u>If Yes, reference previous report no:</u>																																																																								
<u>Failure Analysis Description</u> Spindle reject rate has increased from 20% to 50% due to thread "damage". Investigations found that some of rejected spindles were caused by an incomplete cleaning of the dry film lubricant.																																																																												
<u>Root Cause Description</u> <u>End Item Root Cause Failure Mode:</u> CONTAMINATION - nonmetallic The spindle assembly, which is shown in Figure 1 (Ref. Supporting Documents / Pictures; Record 1) attaches the rotor blade assembly to the main rotor hub assembly. The spindle assembly comprises mainly the spindle subassembly and the spherical & thrust elastomeric bearings, which take the bending and twisting movements of the rotor blade. Discussions with shop mechanics revealed that the spindle fall out rate has increased from 20% to 50% due to thread damage. Further investigations found that some of rejected spindles were caused by an incomplete cleaning of the dry film lubricant from the spindle threads.																																																																												
<u>Proposed Corrective Action</u> Supplier currently uses Plastic Media Blast (PMB) to clean threads. This has resulted in a high reject rate due to incomplete cleaning of threads (fails thread inspection). Alternate method is chemical stripping. There is an alternate method for cleaning threads that is outlined in Navy Manual DMWR 1-1615-377. MED (AMCON) issued letter (MEC T29708) dated 3 May 2004 that allows CCAD to use the chemical strip as their preferred method for thread cleaning. FRACAS recommendation implemented via SACPAR C026-04 (G. Stathis)																																																																												
<u>Work Performed</u> 5/6/2004 - There is an alternate method for cleaning threads in DMWR 1-1615-377. CCAD currently uses Plastic Media Blast (PMB). This has resulted in a high reject rate due to incomplete cleaning of threads (fails thread inspection). This PMB process is operator dependent and susceptible to improper cleaning of the dry film lubricant from the spindle. Incomplete removing of the dry film lubricant can cause the spindle to fail its thread measurement test. Alternate method is chemical stripping.		<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th colspan="5" style="text-align: center;">Disposition of Failed Parts</th> </tr> <tr> <th style="width: 5%;"> </th> <th style="width: 20%;">Part Number</th> <th style="width: 20%;">Part Nomenclature</th> <th style="width: 15%;">Cause</th> <th style="width: 15%;">Disposition</th> <th style="width: 10%;">QTY</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>70102-08201-156</td> <td>Spindle</td> <td>Damage</td> <td>Scrap</td> <td>1</td> </tr> <tr><td>2</td><td> </td><td> </td><td> </td><td> </td><td> </td></tr> <tr><td>3</td><td> </td><td> </td><td> </td><td> </td><td> </td></tr> <tr><td>4</td><td> </td><td> </td><td> </td><td> </td><td> </td></tr> <tr><td>5</td><td> </td><td> </td><td> </td><td> </td><td> </td></tr> <tr><td>6</td><td> </td><td> </td><td> </td><td> </td><td> </td></tr> <tr><td>7</td><td> </td><td> </td><td> </td><td> </td><td> </td></tr> <tr><td>8</td><td> </td><td> </td><td> </td><td> </td><td> </td></tr> <tr><td>9</td><td> </td><td> </td><td> </td><td> </td><td> </td></tr> <tr><td>10</td><td> </td><td> </td><td> </td><td> </td><td> </td></tr> </tbody> </table>				Disposition of Failed Parts						Part Number	Part Nomenclature	Cause	Disposition	QTY	1	70102-08201-156	Spindle	Damage	Scrap	1	2						3						4						5						6						7						8						9						10					
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<u>Work Performed by:</u> John Johnson		<u>Report Written by:</u> John Johnson		<u>Title:</u> Technician <u>Report Written Date:</u> 6/6/2005																																																																								

FIG. 4