

CCGS Henry Larsen

Status of Helicopter Hanger

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Indal Technologies
Telescopic Aluminum Helicopter Hanger
Model 1256-001, Cont No 110-0009
Ident No 36334, Job No 40-6571
Serial No 001, for CCG Type 1200

Summary

The Indal Telescopic Helicopter Hanger is an important part of CCGS Henry Larsen's fitted equipment. Helicopter operations occur regularly and frequently both during the summer arctic and winter seasons. Each helicopter flight operation requires the hanger be retracted and extended.

CCGS Henry Larsen has experienced mechanical failures of the traversing pinion drive shaft shear pin and pinion gears of the helicopter hanger traversing mechanism and erratic 'jumping' motion of the leading section of the hanger as it extends and retracts. Corrosion is occurring between the aluminum channel extrusions and steel flight deck and between the aluminum channel extrusions and rack gear segments and this likely accounts for the jumping or erratic traversing of the hanger sections. It also probably accounts for the traversing drive shaft shear pin and pinion gear failures. Precipitation is leaking into the hanger through the weather seals and one of the four electrical track heating elements has failed and is isolated leaving that section of hanger track without protection from ice and snow build up

An FSR should be contracted to inspect hanger items referenced above as well as the hanger drive assemblies including the electric motor, gearboxes, pinion shafts and gears and the door and drive assembly.

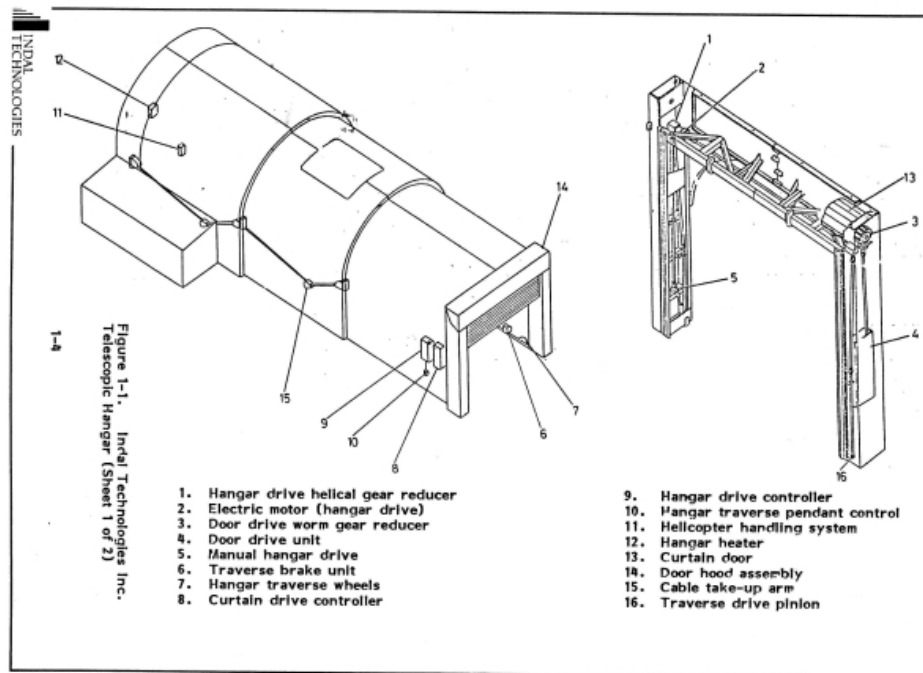
This could be done during the post arctic maintenance period in October 2011 with the intention of developing a specification of the work needed and parts required. This would allow time to have parts ordered and or/fabricated so as to be on hand for the 2012 retrofit when the actual repair work would be completed.

Observations

- When traversing (extending and retracting) the hanger the leading and trailing sections vibrate quite a bit and their movement is 'jumpy'.
- The vessel has experienced traversing pinion drive shaft shear pin failures and pinion gear failures for the last couple of years.
- The hanger wheel assemblies have been disassembled and inspected with no major wear or deformities seen that could account for the vibration and wear observed.
- Sections of the hanger track continuous rack gear are being pushed out from the aluminum extrusion by corrosion occurring between them. Several have been removed, the corrosion removed and the rack gears reinstalled.
- Precipitation has been leaking into the hanger when it is extended.
- Preventative maintenance is ongoing to prevent; and corrective maintenance has been taken to repair failures however existing conditions indicate major work is required.
- The condition of the helicopter hanger is such that continued safe reliable operation of the hanger assembly will soon be negatively impacted.

Introduction

The telescoping hanger consists of arch shaped sections supported on aluminum wheels which ride on tracks fixed to the ship's deck. There are three arch shaped sections, fixed, trailing and lead. The lead section is the outermost. It carries the door assembly and contains all the mechanisms for hanger traversing and door movement.



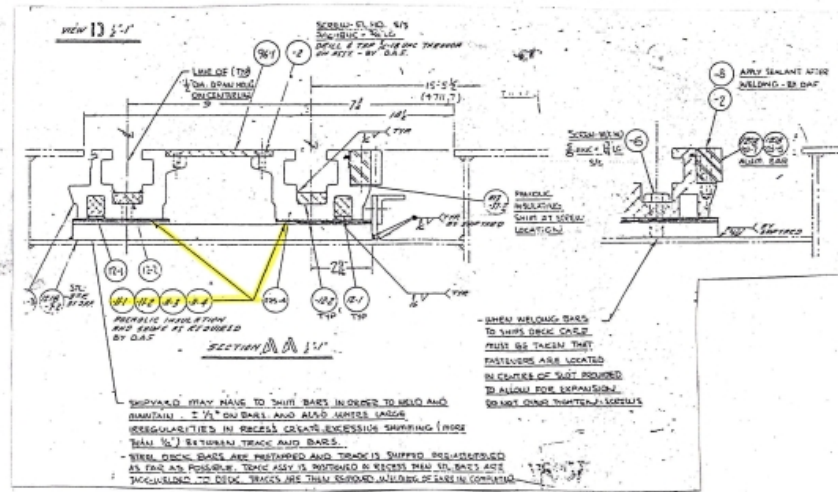
Hanger traversing is by means of a motor driven pinion (one on each wall of the door assembly) which mesh with a continuous rack gear attached to the inside edge of the deck mounted tracks. The pinions are driven by a single electric motor through reduction gears.

The hangar door curtain is a rolling type consisting of a series of aluminum slats which interlock with each other, fitted with roller windlocks on each end. The roller windlocks run in a guide extruded from aluminum alloy which is fitted with stainless steel wear strips.

Weather seal strips consisting of interlocking extrusions and neoprene seals are installed in the hanger and door section to prevent the ingress of water and sea spray. The seal is sandwiched between the mounting surface and a metal backing strip that is secured by rivets.

Hanger Tracks

The hanger tracks are aluminum channel extrusions approx 4" high mounted to the ship's steel flight deck. Phenolic insulating material is fitted to insulate the track from galvanic action. Aluminum insert shims are used to level the track overall. Track mounting plates position the track assembly to conform to the flight deck lateral profile.



The area in way of where the aluminum track is fastened to the steel decking is showing signs of severe corrosion. Phenolic insulating material (highlighted in yellow above) is fitted to isolate the aluminum from the steel however it is seen to be failing and the aluminum track extrusion is corroding as per the images below.



The installation instructions in the Indal manual state that ‘hanger track assembly is to be held level laterally to within $\pm 1/32$ ” and held parallel to each other and to the centreline

of the hanger to within $\pm 1/16''$. (Manual sect 8-8).'With the track support structure corroding as it is this alignment will soon be adversely affected if it is not already.

Hanger traversing (extending and retracting) is accomplished by means of a motor driven pinion (one on each wall of the door assembly) which mesh with a continuous rack gear attached to the inside edge of the deck mounted tracks. The pinions are driven by a single electric motor through reduction gears. The drive pinion tooth crest to rack gear root clearance should be adjusted to 0.8 mm. (Manual sect 6-14)



The image above shows a continuous rack gear section pushed out from the aluminum extrusion by corrosion occurring between them.

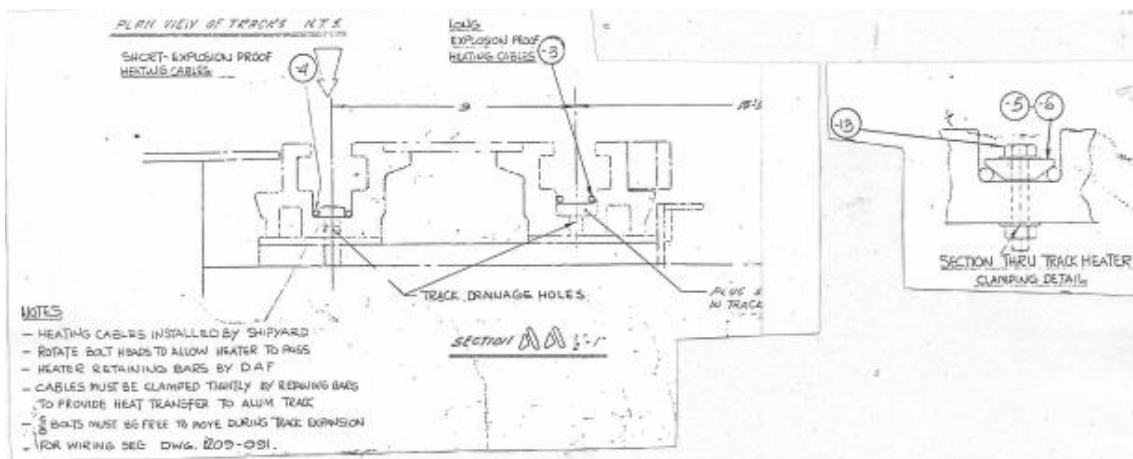


The above 2 images show the corrosion occurring between the continuous rack gear section and aluminum extrusion. This difference in pinion gear to track alignment puts

undue strain on the traversing shaft gear pinion and has resulted in pinion gear drive shaft universal and shear pin failures.

The corrosion occurring between the aluminum channel extrusions and steel flight deck and between the aluminum channel extrusions and rack gear segments likely accounts for the jumping or erratic traversing of the hanger sections. It also likely accounts for the traversing drive shaft shear pin and pinion gear failures.

The hanger tracks are fitted with 24VAC heating cables as indicated on items 3 and 4 below..



The images below show rubbing in way of the retaining bar (item 6 above) securing the heating cable in the hanger track. The retaining bar was pushed up by products of corrosion between it and the aluminum extrusion. It has been removed, straightened and replaced.

One of the four heating cable elements has failed and has been isolated leaving one section of the hanger track assembly with no protection from snow and/or ice build-up.

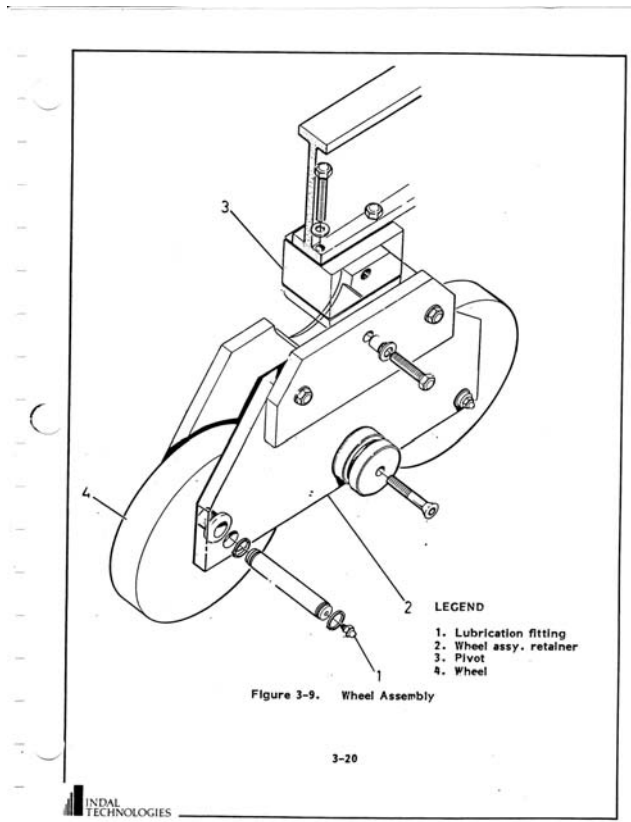




Hanger Wheel Assemblies

There are 8 hanger wheel assemblies as shown below. Four each on the leading and trailing hanger sections. Each assembly comprises 2 wheels mounted in a 'rocking' mounting. The wheels are aluminum fitted with phenolic bushings.

A rectangular phenolic strip screwed to the underside of the hanger at the wheel locations and is inserted into a Tee shaped guide in the hanger track extrusions to prevent any uplift tendency caused by high winds or ship movement.



The images on the following page show rubbing on the wheel assemblies on the trailing hanger section and on the pick up pads. The pick up pads are located on the aft end of the trailing hanger section. When the hanger is being retracted the leading hanger section picks up the pads to pull the trailing hanger section with it. The rubbing marks would indicate either lateral movement of the hanger leading section or deformation of the leading hanger section.

We have disassembled and inspected the wheel assemblies and did not see any major wear or deformities that could account for the vibration and wear observed.



The images below show wear on the cover for the hanger curtain door assembly.



These wear marks indicate the leading and/or trailing hanger sections are not traversing true to the tracks and or may be moving laterally.

Weather Seals

The image below shows rubbing along the top of the stationary section of the hanger caused by the weather seal on the trailing hanger section during traversing of the trailing section.





The image above shows day light between the stationary and trailing hanger sections with the hanger extended.

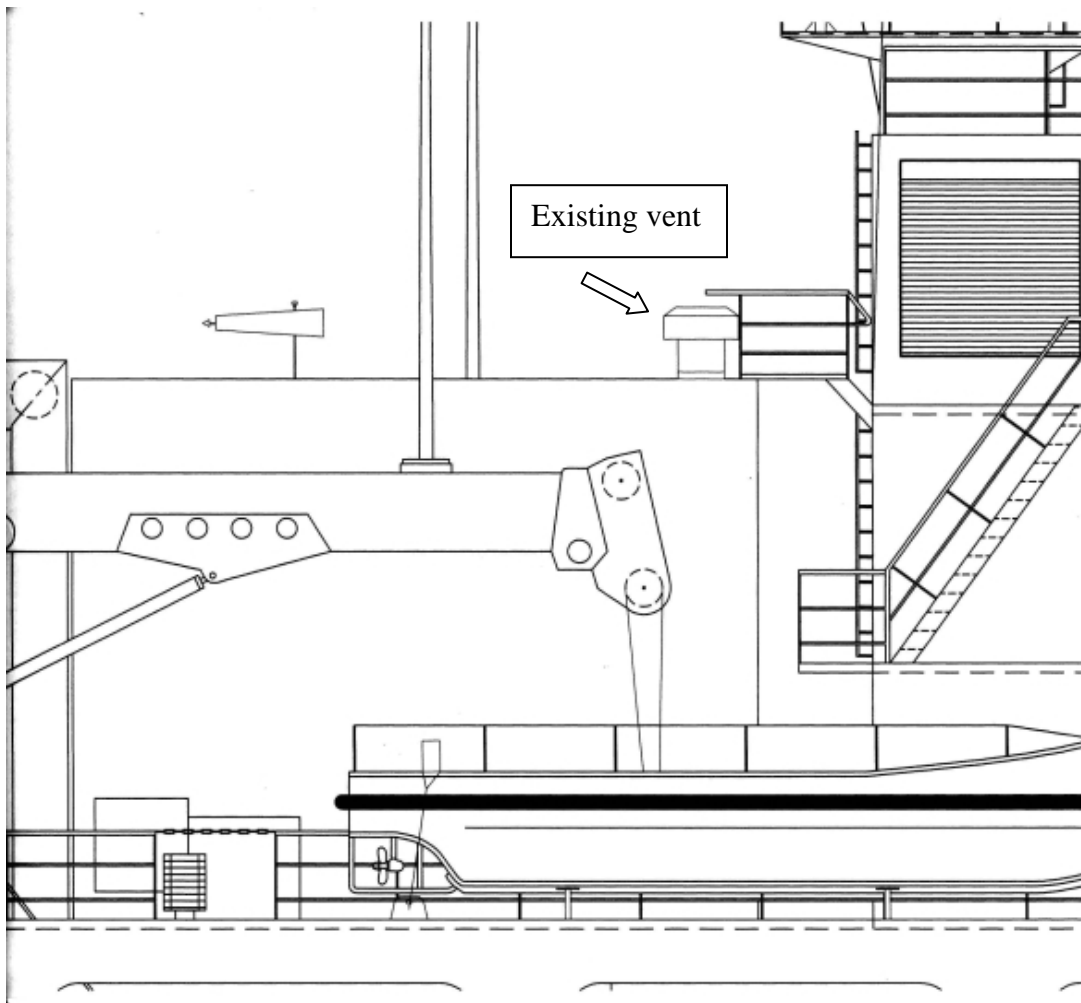
Both of the above and reports of precipitation leaking into the hanger would indicate problems with the weather seals.

Hanger Exhaust Fan

The existing helicopter hanger exhaust fan located on top of the fixed hanger section is not fitted with a fire damper or means of closing it off in the event of a fire in the hanger. While the top of the hanger is accessible from an existing ladder and platform, to reach

the external vent on the hanger top personnel must step on the hanger itself. The hanger top is smooth with no traction or handrail.

It is proposed to fit a self closing fire damper in the trunking and attach an aluminum deck grating c/w handrail to the hanger top to allow safe access to the vent.





Area of proposed new deck grating outlined in green above.

Recommendation

An FSR be contracted to inspect hanger items referenced above as well as the hanger drive assemblies including the electric motor, gearboxes, pinion shafts and gears and the door and drive assembly.

This could be done during the post arctic maintenance period in October 2011. The intent would be to develop a specification of what work is needed and what parts are required such that we have time to have parts ordered and or/fabricated so as to be on hand for the 2012 refit when the actual repair work would be completed.