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STATE OF CALIFORNIA  
DEPARTMENT OF TRANSPORTATION

File: 46.

Page 1 of 2

Assistant Resident Engineer

Report

SFOBB East-Span  
Seismic Retrofit  
Project (SAS)

Robert Kobal

Week of 2012-04-23

**SAS Bridge Travelers/Skyway cleanup**

**Mon 2012-04-23**

Attended general staff meeting.

Attended ABF/CT senior staff meeting.

Attended Champions meeting.

Prepared and attended PMT meeting where fencing on YBI was discussed.

**Tue 2012-04-24**

Prepared for and lead the Skyway cleanup meeting, see meeting minutes.

I worked on direction for CCO 232s1 to incorporate changes from last week's testing.

I discussed with Chris Bausone- CCO 232/232S1 scope and traveler test scheduling

Discussed with Clive Endress- painting traveler and YBI fencing.

**Wed 2012-04-25**

Attended SAS senior staff meeting.

Worked on YBI fence layout.

Worked on security cameras for pier 7, providing direction to ABF for materials needed. To be paid for as part of CCO 12.

Worked on CCO 236, nonskid coating paint color for the bikepath.

**Thur 2012-04-26**

Attended 4 hour Safety standown meeting.

Prepared for and lead the Traveler meeting- see meeting notes.

I received further clarification from Scotty about what was going on with the elevating platform motors, see attached email from him.

\*12 OCT-1 PM 2:47 22043

**Friday 2012-04-27**

Received direction from Bill Casey to paint the entire galvanized pipe on the travelers and to get it done at Westmont. We discussed briefly the alternate proposed decking material as well. I have not heard back officially from Ken Brown about plywood coating acceptability, but METS has suggested an alternate fiber reinforced polycarbonate material which can be painted.

Nicolai informed me that METS will not continue to do the water removal work on the Skyway bikepath panels. I discussed with Bill that I would have ABF do the water removal per cco 217. Directed ABF to do water removal from Skyway bikepath panels.

Off in PM.

**Saturday 2012-04-28**

5 hours

Worked on direction to ABF for water removal from the bikepath panels, other various cco issues, completing diaries, travel expense forms.



---

Robert Kobal  
Senior TE



Roy Scott  
<rscott@hydraulic-controls.com>

04/26/2012 08:28 PM

Please respond to  
<rscott@hydraulic-controls.com>

To 'Ida Goldenberg' <idag@westmont.com>

cc 'Chris Bausone' <cbausone@abfjv.com>, James Duxbury  
<james.duxbury@tylin.com>, John Otter  
<joeseng@sympatico.ca>, Robert Kobal

bcc

Subject RE: IR motors, conclusions, and recommendations

Hello, Ida,

Previous to the week of testing, your mechanic, Manny Macias, experienced a severe 'locking' with one of the 34RA011 and one of the 34RA017 motors. The motors would not turn when shop air was applied. It was locked in place. The motors were removed from service, and sent to the Chino IR Authorized Test Facility. Manny installed a second 34RA011 motor on the SAS Traveler for the subsequent test. The report from the Chino Test Facility was that the motors were 'dry', and ran properly on their bench test.

On Tuesday, April 18, Manny and I began testing the second motor that Manny had installed. The motor was connected to the Elevating Platform through a standard shaft coupling properly sized. Installed on the ports of the motor were quick exhausts with Parker F800B Flow Controls on each quick exhaust. The Flow Controls were adjusted to the full open position. Additionally, pressure gauges were installed on 1/2" Tee fittings directly connected to both motor ports of the motor between the motor port and the Quick Exhausts. The Air Hose size to the Motor was 3/4", with a two 3/4" Lubricators installed about eight feet from the motor, one lubricator for the 'Up' hose, the other for the 'Down' hose.

Testing started by operating the 4-way IR valve in the up position. At 100 psi, the motor did not move. Pressure was blowing out the opposite quick exhaust. After several attempts, the motor did not move. I placed a call to Roger Straubaugh requesting that he come to assist us, which he did. He was in Santa Maria. So the trip was about three hours. Meanwhile, Manny and I continued to work on getting the motor to work. Manny tested the torque required to lift the Elevating Platform by using a Torque Wrench. Only 68 ft/lbs of torque was required to lift the platform and 39 ft/lbs of torque required to lower the platform. Those torque requirements are well below the stated starting torque of the IR motor of 98 ft/lbs at 90 psi. (see attached IR MultiVane Spur Gear Air Motor PDF, pg 38).

Next, the motor was disconnected from the Elevating Platform by removing the coupling, and removing the bolts securing the motor, then removing the air connections. Using IR lubricating oil, about 1/8 cup of oil was poured into each port. Again, the shaft would turn by hand. The air system was reconnected to the motor, but the motor was still disconnected from the Elevating Platform. There was no change: The motor did not turn in either direction.

I instructed Manny to operate the 4-way valve in the following manner: First, full throttle up; then, full throttle down; then full throttle up, and again full throttle down. This was done for about two minutes. After two minutes, the motor began to turn 1/4 turn up, then 1/4 turn down, locking after each turn. Shortly, the motor turned 1/2 turn up and 1/2 turn down, locking after each turn. Last, the motor turned 3/4 turn up, lock, then 3/4 turn down, lock. Finally, the motor turned freely up then freely down. We reinstalled the motor, tested the up and down, but received the same result as before: The motor would not move either way when presented with a load.

Roger arrived while we were at lunch. When he called me, we came back from lunch to work with him on the motor. Roger concluded that the 100 psi into the motor, with no movement, was artificially created by the Flow Controls. He stated that the motor should run from the factory. At his suggestion, we removed the F800B Flow Controls from the exhaust ports of the motor. We tested the motor. Still no movement. We all discussed for a while. We continued trying the motor, using our up then down method. (Through all these tests, air was still blowing at near full pressure from the one port to the other with no movement even with the Flow Controls removed.) Then, for no apparent reason, the motor 'grabbed' enough to begin to lift. We stopped. Then started up again. We raised the platform about half way. Then we lowered the platform. Each time we raised the platform, the motor started grudgingly. (This even occurred on the official Platform test the next day.) Roger concluded that the Flow Control was preventing the lift, a statement I immediately rejected. Roger was not happy with that. Roger has given Westmont the IR company line.

Let's look at the facts of Pressure and Flow. Pressure is created ONLY by resistance to flow. That's it, nothing more. No resistance to flow, no pressure. The motor not turning while disconnected from the Platform created 98psi. The measurement out the exhaust port was 94 psi. That flow was moving around the vanes in some fashion to allow flow at a measurable pressure through the motor with no rotation of the shaft. Flow, on the other hand, creates ONLY speed: more flow, more speed. From IR's own chart specifications, the maximum flow is 183 SCFM at max RPM of 490. Our RPM was zero with the flow control installed and zero with the flow control removed. (Note that IR's own chart has not minimum flow requirement.)

Is the flow control a restriction. Yes: it allowed only 38 SCFM, it's maximum flow capability, to pass through the motor. That should have been enough to lift the platform because flow does not determine the torque, pressure determines the torque. Flow determines the speed. And, as all saw, when the motor finally started working, the platform lifted very slowly.

Now a word regarding IR's documentation. First, the 34 Series Air Motor: Notice there is no Flow requirement for Starting Torque, only a pressure requirement. I questioned John Otter on this fact more than a year ago. (We had a humorous conversation. He asked, "Scotty, what creates torque, flow or pressure? I replied, "May I withdraw the question?", because, I already knew the answer: Pressure. Turning a rotary member did not need a starting flow.) This is why there is no minimum flow requirement, just a maximum flow limitation. Once again, because the flow control limited the flow to 38SCFM, no specification was violated. The flow control had nothing to do with the failure of the motor.

One final comment. A pressure gauge was installed on the gear casing section of the gear motor. Excessive air had been coming from the gear casing section. While testing on Thursday, when the Elevating Platform reached stall condition, we watched the gauge rise to 40psi before stopping the test. I would have expected some pressure build up inside the gear portion due to the size of the gear. The teeth of the gear act as a fan. But at Stall, the gear is not moving. There should be no fan effect. So, there may be a shaft seal leak between the motor section and the gear section.

Conclusion:

It is my opinion that the failure of the motors to rotate when pressure was

applied was due to inadequate vane lubrication installed at the factory. No written instruction was given in the IR Installation and Maintenance Manual regarding additional lubrication required at startup. IR requires only that the lubricators be adjusted to 60 drops per minute (full open). This was followed, as was attested by the overabundance of oil coming from the exhaust ports. It is possible that the vanes were dry enough to allow air flow to bypass through the rotor without moving the vanes. (This may account for the significant exhaust flow when the motor was not turning.) Once the motor was flooded with lubricant as described in our procedure above, the vanes swelled sufficiently to create a seal against the rotor, thus allowing the rotor to begin turning.

Recommendations:

It is my recommendation to Westmont Industries that the procedure outlined above for the break-in of all IR motors be followed.

With the facts established by testing that no motors tested worked on startup, it is my recommendation that Westmont should request that the 34RA011 gear motors at minimum should be returned to the Chino facility and resealed as necessary, and new vanes installed if damaged. This should be done on a warranty basis at no cost, including inspection fee, to Westmont or Cal Trans.

Please feel free to use all or part of my statement and observations in support of your warranty request.

Sincerely,

Roy "Scotty" Scott  
Pneumatic/Vacuum Product Specialist  
Hydraulic Controls, Inc  
2136 Stagecoach Rd  
Stockton, Ca 95215  
(209) 466-1531 Office  
(209) 466-3309 Fax  
(559) 280-0064 Cell  
<http://www.hydraulic-controls.com>

-----Original Message-----

From: Ida Goldenberg [mailto:idag@westmont.com]  
Sent: Thursday, April 26, 2012 7:22 AM  
To: rscott@hydraulic-controls.com  
Cc: Chris Bausone  
Subject: FW: IR motors

Scotty,

Roger is right about that we had tested only 34RA011.  
But when we were trying to assess what is going on with the motors - we ran air thru one of the 34RA017 motor too.  
The result was the same for both models - "sticky" motor.  
We had sent one the 34RA017 to Pacific Coast repair shop, and their answer was the same - the motor was dry

But the "brass flow controls"?! Is the "brass" the issue here?  
I think that Roger is trying to divert attention from IR.

-----Original Message-----

From: Strasbaugh, Roger [mailto:rstrasbaugh@electair.com]

Sent: Wednesday, April 25, 2012 4:49 PM  
To: Ida Goldenberg  
Subject: Re: IR motors

Ida I will contact Tim and see what he would like to do from the IR standpoint. At this point the only motors that I believe have been installed or tested are the 34RA011. The 34RA017 unit I don't think have been installed or tested. After seeing the installation we confident the issue was the brass flow controls that were installed on each port.

Roger

Sent from my iPhone

On Apr 25, 2012, at 4:07 PM, "Ida Goldenberg" <idag@westmont.com> wrote:

> Roger,  
>  
> After the SAS-EB traveler test Rob Kobal had strongly recommended that  
> all motors purchased thru Elect Air went for "re-built", paying  
> special attention to the seals, vanes, lubrication, etc.  
> When WMI/Zemarc was dealing with the "sticky" motor, we approached  
> Pacific Coast in Chino, because they are IR certified repair shop.  
>  
> As of now all motors are ready to be serviced.  
>  
> Are you going to contact Tim Croxall (IR rep), should I do that, or I  
> can call directly to the shop and have them pick-up all motors?  
> After all, they are aware of the issues we are facing with these motors.  
>  
> Also, the next round of testing is set for June 4-th, 2012. However,  
> Scotty is going to be in WMI on 5/29/12.  
> Prior to testing I would like to have two motors model 34RA017 in our  
> shop around 5/15/12.  
> It will give us ample time to get ready for the test.  
>  
> Thank you,  
>  
> Ida Goldenberg  
> idag@westmont.com  
> ph: (562) 944-6137  
>  
>  
> -----Original Message-----  
> From: Roy Scott [mailto:rscott@hydraulic-controls.com]  
> Sent: Wednesday, April 25, 2012 3:05 PM  
> To: Chris Bausone; Ida Goldenberg  
> Subject: IR motors  
>  
> Hello Ida,  
> Recall that we discussed last friday the IR motors. Today, I had a  
> phone conversation with Roger Straubaugh. I mentioned that we  
> measured the pressure inside the gearbox of the motor at stall. The  
> pressure kept rising.  
> I stopped the test at 40 psi. That tells me that there probably is a  
> leak in the seal.  
> I informed Roger that you(Westmont) may be sending at lease that motor  
> back for inspection and repair under warranty. He seemed fine with that.  
> With that type of gear box pressure, that motor should be checked and  
> repaired. It is the 34RA011 on the SAS we were testing. The motor

> should be returned through Elect Air Tool, whom Roger represents.  
>  
> Email me if I may assist.  
>  
> Thanks  
>  
> Scotty  
> Roy "Scotty" Scott  
> Product Specialist  
> Hydraulic Controls, Inc  
> 2136 Stagecoach Rd  
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