

Ingenious!

by LCdr. Joel Zupfer

At the risk of damaging my ego, let me tell you about a situation I feel very lucky to be able to write about. I was a senior lieutenant and functional-check pilot, doing a routine track and balance on an SH-60B. My copilot was an O-4 select and a newly designated HAC, who had transitioned to aviation from surface line and recently had completed his first deployment.

Our crewman had a few hundred helo hours and was new to FCFs. All the ground checks went smoothly, and before long, we were taxiing to the parallel for hover checks. During taxi, I noticed the helo randomly hopping and the flight controls moving. I asked the crew if they felt the hop. They said they didn't, until I pointed it out the next time it happened.

The movement was very small, and we thought it might have been caused by the automatic flight-control system (AFCS). However, securing both the SAS 1 and SAS 2 didn't

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Photo by Matthew J. Thomas

Why would a Seahawk randomly hop while taxiing? The author found the surprising answer in the collective-boost servo under the turtleback (photo taken in an HH-60H).

solve the problem, and we continued taxiing to the helo pad for hover work. Thinking it may have something to do with yaw control, we discussed what we would do if we lost thrust in a hover.

After the takeoff checks, I smoothly added power, lifting the helo into a stable, 10-foot hover. The controllability checked normal, so we continued with the remaining hover checks. After completing the hover portion of our vibration run on the VATS box, we departed the pattern to collect the remaining data for the track and balance. The aircraft flew normally, with no noticeable deviations from the trimmed attitude. While taxiing back to our line, I noticed the same hopping and again tried to isolate the cause. The wind was gusty that day, but I had never experienced anything like this.

After a normal shutdown, I reinspected the hydraulics bay and the rotor head for anything unusual. I found nothing. I asked the maintenance control chief if anyone had reported anything

similar, and he said no. The track and balance we completed was out of limits, so mechs made the adjustments, and we headed back out for another vibe run. As we taxied out to the helo pad, the aircraft started randomly hopping again. This time I had my copilot take the controls to see if there was anything different in the two sets of controls. There wasn't.

Not feeling good about the condition of the aircraft, we taxied back to the line, shut down, and asked for an airframes troubleshooter. After explaining the problem to him, he opened the hydraulics bay and asked me to move the flight controls while he inspected the boost servos. After a minute, he climbed down, told us he'd found the problem, and asked us to shut down the APU. I eagerly climbed on top of the aircraft and was amazed when the troubleshooter pointed to the aft end of the collective-boost servo. The clevis had broken off from the cylinder rod. The break was so clean that when the two pieces matched up, you could not detect the break (hence the reason for missing it on preflight). The break could only be detected when the flight controls moved. Whenever the cylinder rod moved forward, the pieces would separate. When it moved aft, it would bump the loose end, causing a small impulse into the collective channel (which explained the hopping during taxi).

If the collective channel was in two pieces, how could we control the aircraft at all during flight? On the H-60, a C-shaped bracket runs parallel to the collective-boost servo, connecting the input and output of the servo in the event of such a failure. Another function of the bracket is to allow the aircraft to be flown without the using the boost or pilot-assist servos. After talking with the maintenance control chief, I found out that he knew of similar instances. Knowing I wasn't the only one to have this happen made me feel a little better, but I still felt less than smart for taking the aircraft flying in the first place.

As an engineer, I certainly appreciate the ingenuity of the system design. As a pilot, I am just plain thankful. 🦅

LCdr. Zupfer flies with VC-8.