

TEST REPORT

CYCLE TESTING FOR THE SMARTORK INCORPORATED SMARTORK REEL CLOSER

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Revision 0

SwRI® Project 18.18151.05

Prepared for:
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The results of this test report apply only to the specific samples tested. If the manufacturer extends the test results to apply to other samples of the same model, or from the same lot or batch, the manufacturer should ensure the additional samples are manufactured using identical electrical and mechanical components. This test report shall not be reproduced, except in full, without written approval of Southwest Research Institute.



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0 Release Control Records

Below is a table documenting the various changes recorded in this report. Each issuance of the report is clearly marked with the revision number and date of issue.

Table 0.1: Revision Table

ISSUE NO.	REASON FOR CHANGE	DATE ISSUED
0	Original Release	May 05, 2011



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1 EXECUTIVE SUMMARY

Cycle testing was performed at Southwest Research Institute® on the SmarTork Reel Closer supplied by SmarTork Incorporated. The testing was performed to verify that hundreds of thousands of operations of the SmarTork Reel Closer would not show a deleterious effect on the performance of the device. The testing was performed in accordance with a test plan provided by SmarTork Incorporated.

Upon visual inspection, after completion of the testing, the device did not sustain any damage as a result of the cycle testing. Additionally, no significant loss in performance was observed during the cycle testing.

2 REFERENCE STANDARDS AND SPECIFICATIONS

SwRI SOP-760-01, *Control of Monitoring and Measuring Devices*, Rev. 6.

3 TEST FACILITY

*Southwest Research Institute
Mechanical Engineering Division
6220 Culebra Road
San Antonio, Texas 78238*



4 TEST ITEM IDENTIFICATION

The equipment under test (EUT) is the SmarTork Incorporated SmarTork Reel Closer. Its purpose is to aid in opening and closing elevator doors. The SmarTork Reel Closer is shown in Figure 4.1. A test fixture was designed, built, and provided by SmarTork Incorporated. This fixture is shown in Figure 4.2.



Figure 4.1: SmarTork Incorporated SmarTork Reel Closer

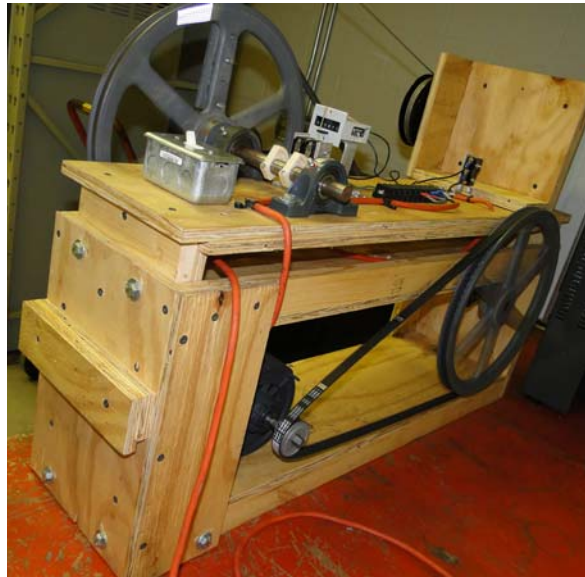


Figure 4.2: Test Fixture

5 SMARTORK REEL CLOSER CYCLE TESTING

REQUIREMENT: The EUT shall not sustain any physical damage or significant loss of performance when subjected to cycle testing.

TEST PROCEDURE:

1. Secure the EUT to the SmarTork Incorporated test fixture.
2. Record maximum current draw during initial cycling.
3. Begin the fatigue phase of the test for at least 500,000 cycles.
4. Wind reel to high-tension position.
5. Record maximum tension and tension at the opening position.
6. Begin the high-tension phase of the test for at least 200,000 cycles. The test is to be paused ten times to take maximum tension and tension at the opening position measurements. The tension measurements are to be taken by a 50 pound capacity hand-held force gauge provided by SmarTork Incorporated. Perform visual inspections to look for any physical damage as a consequence of the continued cycling of the device.
7. Compare the tension measurements during the high-tension phase to look for any significant loss of performance.

RESULTS: The SmarTork Incorporated SmarTork Reel Closer was setup as shown in Figure 5.1 for the cycle testing. Testing ran between April 4, 2011 and April 20, 2011. The equipment used to perform the test measurements are in Table 5.1. The average maximum current draw over one hundred cycles was 0.045 A. The SmarTork Reel Closer was cycled 505,157 times to fatigue the unit. At the end of the fatigue phase, the unit was wound to the high-tension position to simulate maximum wind load. Under this high-tension condition, the maximum tension measured was six pounds, ten ounces, and the tension at the opening position was measured as five pounds, five ounces. A high-tension test phase was run for 238,033 cycles. The maximum tension and tension at the opening position measurements during the high-tension test phase are recorded in Table 5.2. Comparing the measurements at the beginning, during, and at the completion of the high-tension phase, no significant change in performance occurred as a consequence of the cycle testing. Based upon visual inspection, the cycle test did not damage the SmarTork Reel Closer.

Table 5.1: Equipment Used for Cycle Testing

Manufacturer	Make	Serial Number	Calibration Due
Extech	AC/DC Current Clamp	99113518	07/29/11
Rapala	Hand-held Force Gauge*	-	-

* This device was provided by SmarTork Incorporated



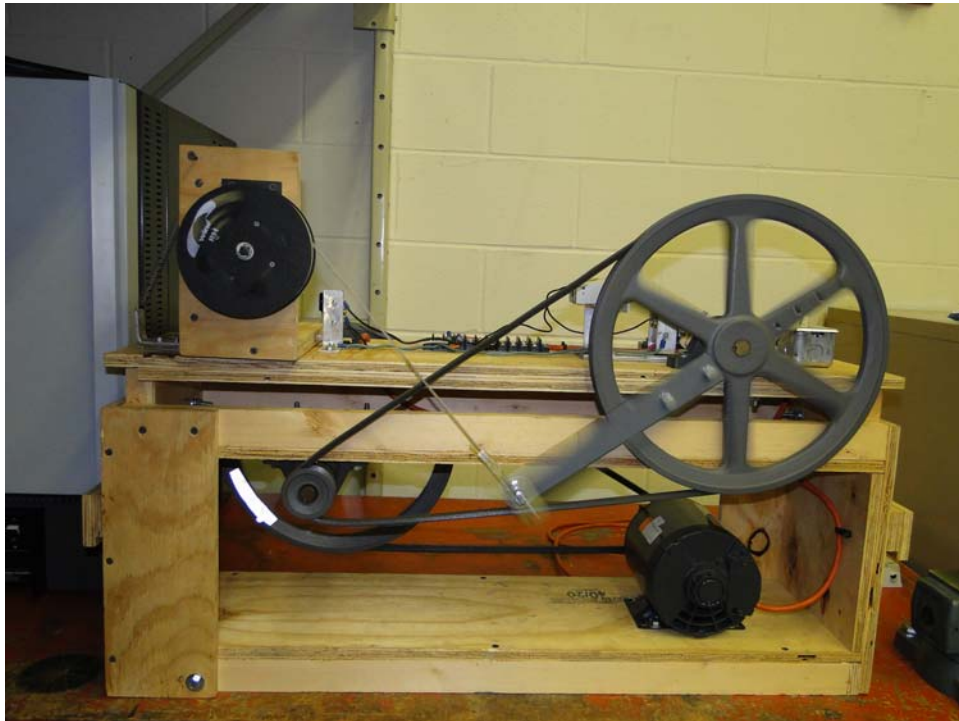


Figure 5.1: Cycle Testing Setup for the SmarTork Incorporated SmarTork Reel Closer

Table 5.2: Tension Measurements during High-Tension Testing

Cycle Count	Maximum Tension	Tension at the Opening Position
509,295	6 lbs 10 oz	5 lbs 5 oz
642,431	6 lbs 10 oz	5 lbs 5 oz
649,102	6 lbs 9 oz	5 lbs 5 oz
655,251	6 lbs 13 oz	5 lbs 6 oz
661,110	6 lbs 11 oz	5 lbs 6 oz
692,715	6 lbs 10 oz	5 lbs 5 oz
699,112	6 lbs 11 oz	5 lbs 6 oz
705,408	6 lbs 11 oz	5 lbs 5 oz
711,281	6 lbs 10 oz	5 lbs 5 oz
742,793	6 lbs 11 oz	5 lbs 6 oz

APPENDIX A LABORATORY DATA LOGS



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TEST ITEM IDEN. SmartTork PAGE 1 OF 3
 TEST PROCEDURE REF. Test Plan PROJECT NO.: 18151.05.101
 TEST NAME Cycle Test

Date	Time	Initials	Observations
4/4/11	0850	mcw	1 cycle current measurement .06 Amps
	0853	mcw	10 cycles " " .04 Amps
	0855	mcw	10 cycles " " .04 Amps
	0857	mcw	10 cycles " " .03 Amps
	0900	mcw	10 cycles " " .04 Amps
	0903	mcw	10 cycles " " .03 Amps
	0904	mcw	10 cycles " " .02 Amps
	0905	mcw	10 cycles " " .04 Amps
	0905	mcw	10 cycles " " .02 Amps
	0906	mcw	10 cycles " " .05 Amps
	0907	mcw	10 cycles " " .04 Amps.
	0921	mcw	AVG Current measurement 0.045 Amps.
	0923	mcw	EXTECH AC/DC Current Clamp #N: 008014 SN: 99113518 Due: 7/29/11
	4/5/11	1608	mcw
1620		mcw	Start Cycle Test Counter Reading = 000000
4/6/11	1628	mcw	Counter Reading = 051502 6" = 4 lbs 11oz 24" = 5 lbs 1oz
4/7/11	1626	mcw	Counter Reading = 102640 6" = 4 lbs 9oz 24" = 5 lbs 1oz
4/8/11	1652	mcw	Counter Reading = 154680 6" = 4 lbs 10oz 24" = 5 lbs 2oz
4/11/11	0745	mcw	Counter Reading = 288440 6" = 4 lbs 9oz 24" = 5 lbs 2oz
	1632	mcw	Counter Reading = 307111 6" = 4 lbs 8oz 24" = 5 lbs 0oz
4/12/11	1652	mcw	Counter Reading = 358815 6" = 4 lbs 13oz 24" = 5 lbs 1oz

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TEST ITEM IDEN. SmarTork PAGE 2 OF 3
 TEST PROCEDURE REF. Test Plan PROJECT NO.: 18151.05.101
 TEST NAME Cycle Test

Date	Time	Initials	Observations
4/13/11	1655	mcw	Counter Reading = 49849 6" = 4 lbs 13 oz 24" = 5 lbs 10z
4/14/11	16 43	mcw	Counter Reading = 46 0126 6" = 4 lbs 12 oz 24" = 5 lbs 0 oz
4/15/11	14 15	mcw	Stop Test Count = 504958
4/15/11	14 45	mcw	Counter Reading 504958 Optimum Op Close position = 5 lbs 10z (6 1/2") Open position = 4 lbs 8oz (27")
	14 54	mcw	Stop Test Count = 505157 Add ext Turn to increase tension. Optimum Operation Close Door Position = 6 lbs 10oz Operation Open Door Position = 5 lbs 5oz (STRESS Test Simulating Wind Load.)
	15 02	mcw	Start Test New Parameters Count = 505157
	16 58	mcw	Counter Reading = 509295 Optimum Operation Close Door Position = 6 lbs 10oz Operation Open Door Position = 5 lbs 5oz
4/18/11	07 57	mcw	Counter Reading = 642431 Optimum Operation Close Door Position = 6 lbs 10oz Operation Open Door Position = 5 lbs 5oz
	11 08	mcw	Counter Reading = 649102 Optimum Operation Close Door Position = 6 lbs 9 oz Operation Open Door Position = 5 lbs 5oz
	14 00	mcw	Counter Reading = 655251 Optimum Operation Close Door Position = 6 lbs 13 oz Operation Open Door Position = 5 lbs 6 oz

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Paul Orlando



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TEST ITEM IDEN. SmartTork PAGE 3 OF 3
 TEST PROCEDURE REF. Test Plan PROJECT NO.: 18151.05.101
 TEST NAME Cycle Test

Date	Time	Initials	Observations
4/18/11	1700	mcw	Counter Reading: 661110 Optimum Operation Close Door Position: 6 lbs 11 oz Operation Open Door Position: 5 lbs 6 oz
4/19/11	0757	mcw	Counter Reading: 692715 Optimum Operation Close Door Position: 6 lbs 10 oz Operation Open Door Position: 5 lbs 5 oz
	1100	mcw	Counter Reading: 699112 Optimum Operation Close Door Position: 6 lbs 11 oz Operation Open Door Position: 5 lbs 6 oz
	13:05	MG	Counter Reading: 705408 Optimum Operation Close Door Position: 6 lbs 11 oz Optimum Operation Open Door Position: 5 lbs 5 oz
	16:59	MG	Counter Reading: 711281 Optimum Operation Close Door Position: 6 lbs 10 oz Optimum Operation Open Door Position: 5 lbs 5 oz
4/20/11	0755	mcw	Counter Reading: 742793 Optimum Operation Close Door Position: 6 lbs 11 oz Operation Open Door Position: 5 lbs 6 oz
	0809	mcw	Strip Test Counter Reading: 743190

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