# 050-0200 Latch Baseline Application Detail

**Company:** Tri*M*ark Corporation

**Address:** 500 Bailey Ave.

New Hampton, IA 50659

**Product Code:** 050-0200

**Reference Test Document:** ET12163

**Date Tested:** 9/13/13 thru 12/3/13

# DISCLAIMERS

This document is intended to provide a general overview of elements that affect cycle life and performance of Tri*M*ark slim line latches. In no way is it intended to guarantee performance of such product in the customer's particular application.

Tri*M*ark recognizes that applications of this latch may fall within the requirements of FMVSS206 and SAE J839 safety standards for the on-road and off-road operator entrance doors.

These safety related requirements are dependent on door application, e.g. front and rear hinged doors, sliding doors, or hinged upwards swinging doors. The entire door hardware system must be included in the design/analysis process: latch, handle, lock mechanism, rods/linkages, fasteners, hinges, etc. This ensures compatibility of all components within the hardware system. If FMVSS206 is a requirement, then all of the components within the door system must comply with strength, inertia and locking requirements as specified within the Standard.

Tri*M*ark assumes no liability for application of latches within systems which are designed, validated, and produced without the involvement of Tri*M*ark engineering. It must also be noted that both FMVSS206 and SAEJ839 are standards intended to cover entire SYSTEMS and as such the latch is merely a component of that system and shall not be construed to be a system within itself.

Customers applying Tri*M*ark product must take into account a myriad of factors to ensure proper life cycle and performance of the door entry system. Tri*M*ark encourages customers to seek the assistance of our professional Engineering Stall for details and assistance in applying our products to their needs.

# Table of Contents

# 1. General Information

## 1.1. Description of Product

| | |
|---|---|
| Manufacturer: | Tri*M*ark Corporation |
| Product Name: | 050-0200, Slim Line Latch Assembly |
| Sample Quantity: | 12 |
| Failure Criteria: | The rotor and catch will no longer engage |
| | When the latch cannot hold the striker bolt load exerted by the test equipment |
| | When the latch won't run beyond 100 cycles without adjustment |

# 2. Factors for Success

## 2.1. List of Factors

- Minimize Striker Bolt Load ***(SBL)*** throughout life of system
  - Take into account door seal loads
- Striker bolt alignment
  - Maintain proper control of installation alignment
  - Design for minimum hinge sag over time
  - Account for both centerline and axial alignment in design planning
  - For proper alignment of striker please download Striker Installation pdf document on Tri*M*ark website. www.trimarkcorp.com
- Environmental conditions of the system
  - Minimize dust and dirt ingress
  - Minimize moisture ingress
- Weight of the door and how the door is supported
  - Latch is designed to keep door closed, it is not designed to support the door
  - Design for minimum hinge sag over time
  - Welding on or near latches during installation is PROHIBITED and will cause premature failure of critical internal components
- Properly ***Torque*** mounting fasteners during installation
- Properly lubricate moving components throughout life of product

# 3. Test Information

(Testing was done in the test department environment and results in actual application may show different results)

## 3.1. Test Equipment

Bench Cycle Test Equipment

## 3.2. Lab Ambience Condition

70°F ambient temperature

## 3.3. Test Condition

Fixture simulated proper Striker Bolt alignment

No dust or dirt added to test environment

## 3.4. Results and Observations

It was observed from this testing that an increased striker bolt load increases the operational efforts of the latch. Increase striker bolt load also causes noticeable wear inside the latch.

### 3.4.1. Cycle Test Results

| Example | SBL (lb) | SBL (kg) | Cycle Count |
|---|---|---|---|
| 1 | 25 | 11.3 | 100,000 |
| 2 | 25 | 11.3 | 100,000 |
| 3 | 50 | 22.6 | 100,000 |
| 4 | 50 | 22.6 | 100,000 |
| 5 | 75 | 33.9 | 100,000 |
| 6 | 75 | 33.9 | 100,000 |
| 7 | 100 | 45.3 | 100,000 |
| 8 | 100 | 45.3 | 100,000 |
| 9 | 125 | 56.7 | 100,000 |
| 10 | 125 | 56.7 | 100,000 |
| 11 | 150 | 68 | 100,000 |
| 12 | 150 | 68 | 100,000 |

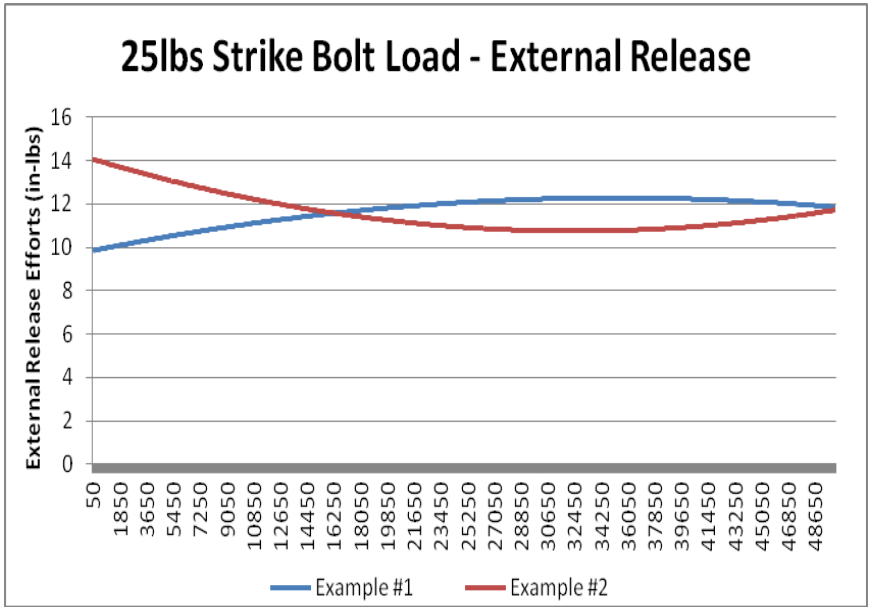
**One cycle represents striker engaging latch, release from inside, then striker engaging latch again and releasing from the outside release. Thus, if the latch reaches 100,000 total cycles than each release lever (inside and outside) achieved 50,000 cycles each**

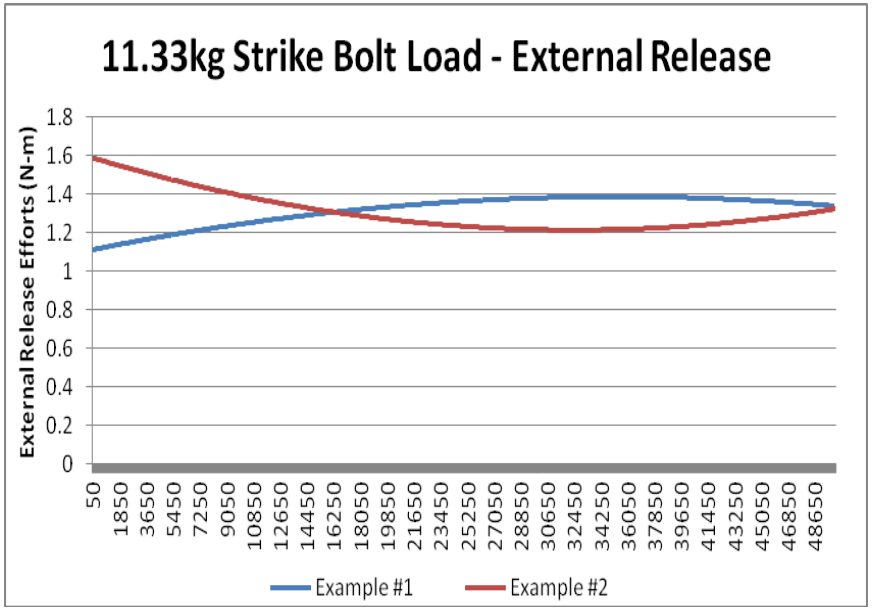
## ***Lubrication***

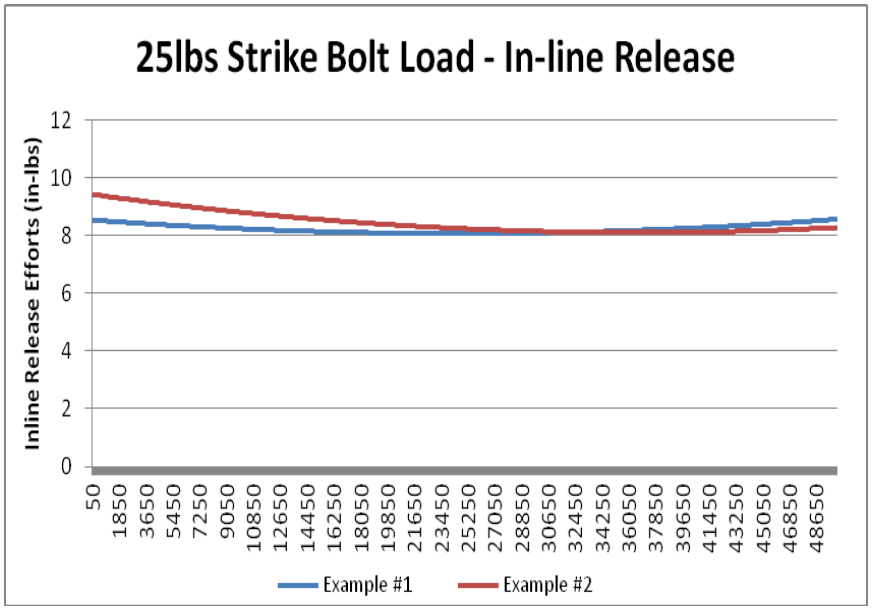
Products manufactured by Tri*M*ark are lubricated and shipped with the minimum amount of lubrication to function correctly when they leave the factory. Many products have a dry-type solid film lubrication applied that will five years of trouble free performance however; mechanical products do require maintenance and periodic lubrication. The application of a quality lubricant such as Alpha 2000 or its equivalent, will maintain the quality and performance of the Tri*M*ark products.

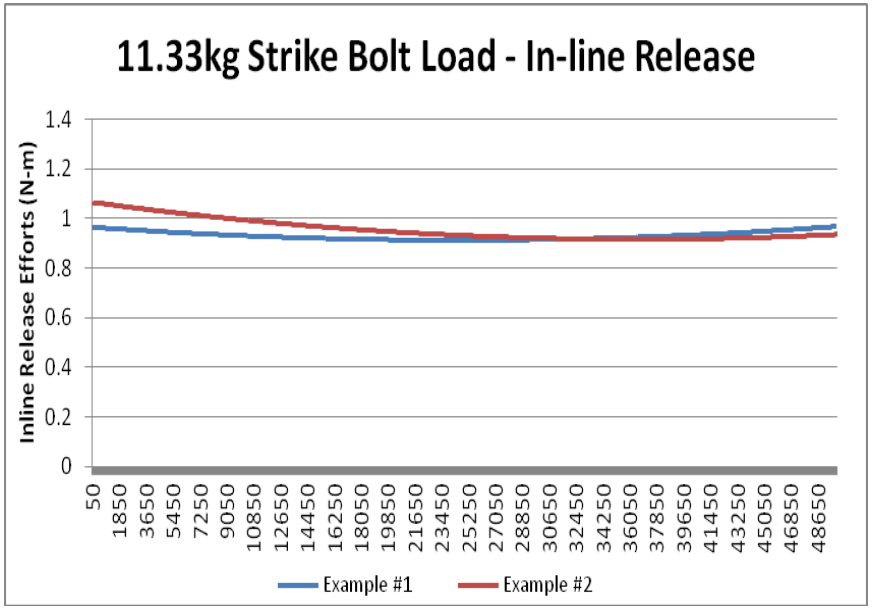
Please note by adding a lubricant to the latch it will increase the chance of the lubricant picking up contaminants such as dust and dirt. These contaminants can cause adverse affects to the performance/life of the latch.

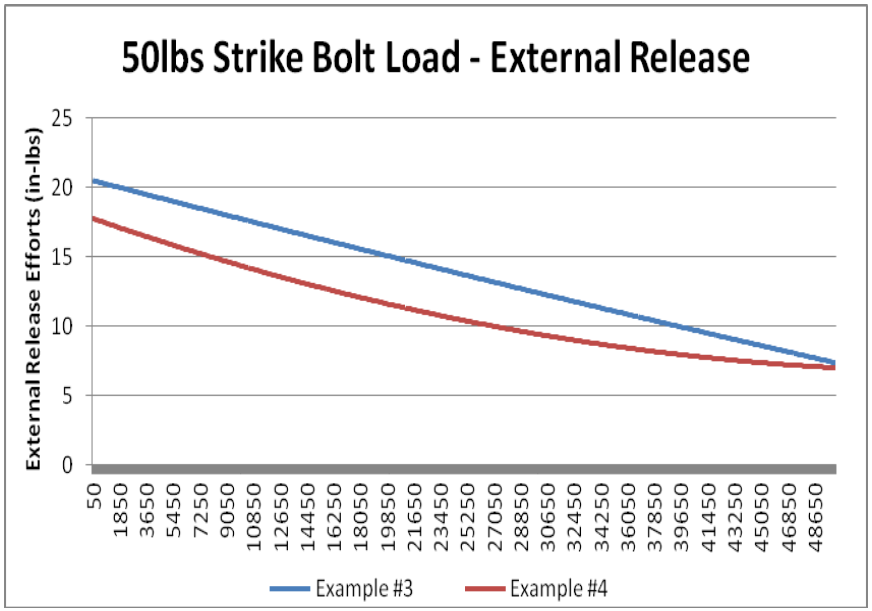
### 3.4.2. Average Release Efforts

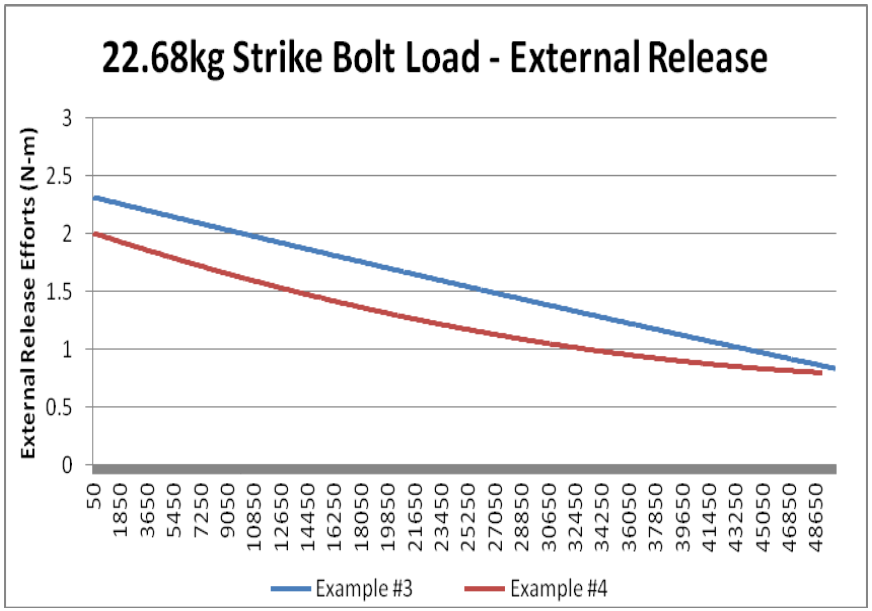


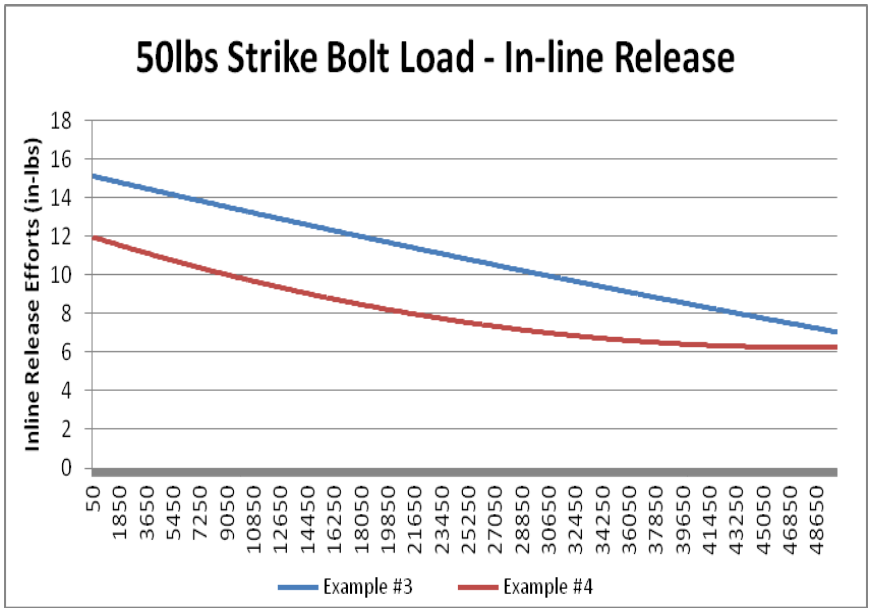



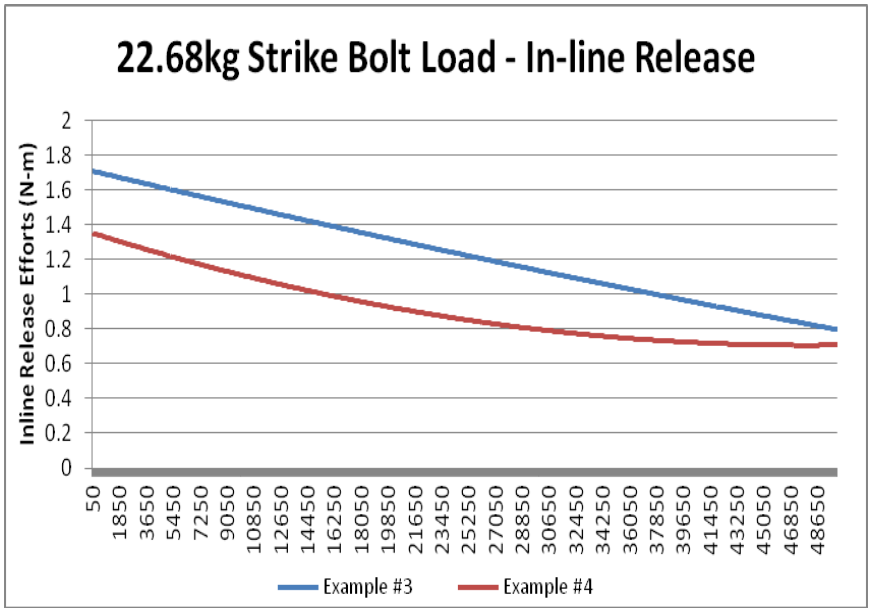



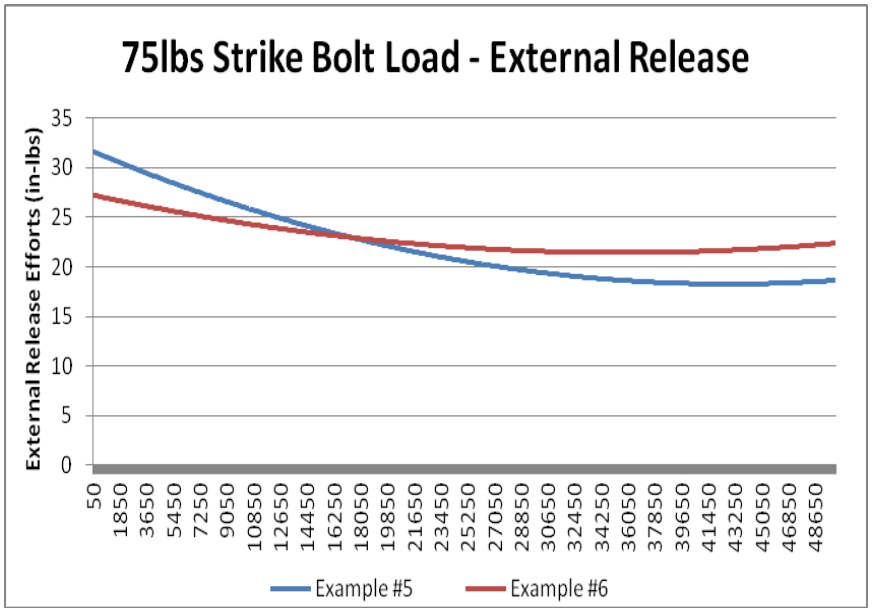



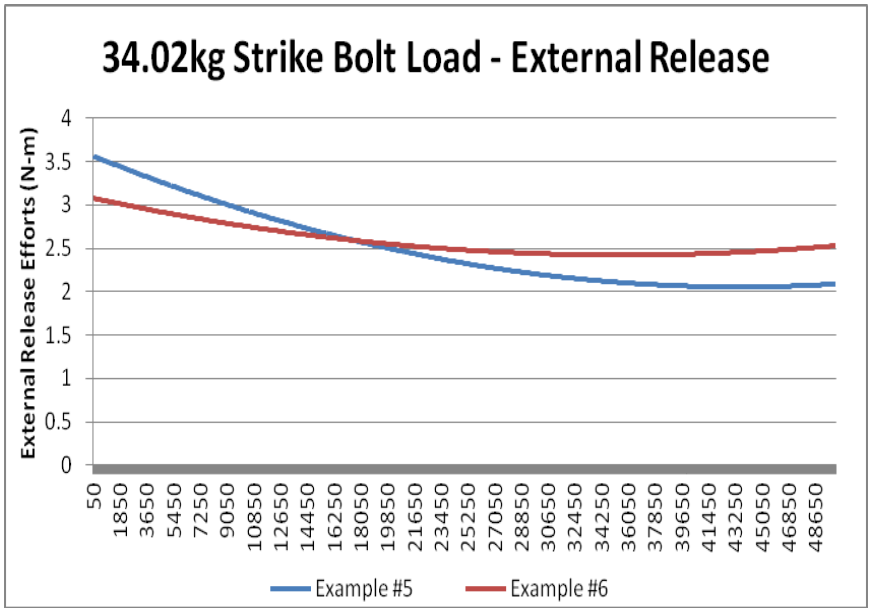

50lbs Strike Bolt Load - External Release
External Release Efforts (in-lbs)
25
20
15
10
5
0
50
1850
3650
5450
7250
9050
10850
12650
14450
16250
18050
19850
21650
23450
25250
27050
28850
30650
32450
34250
36050
37850
39650
41450
43250
45050
46850
48650
Example #3
Example #4

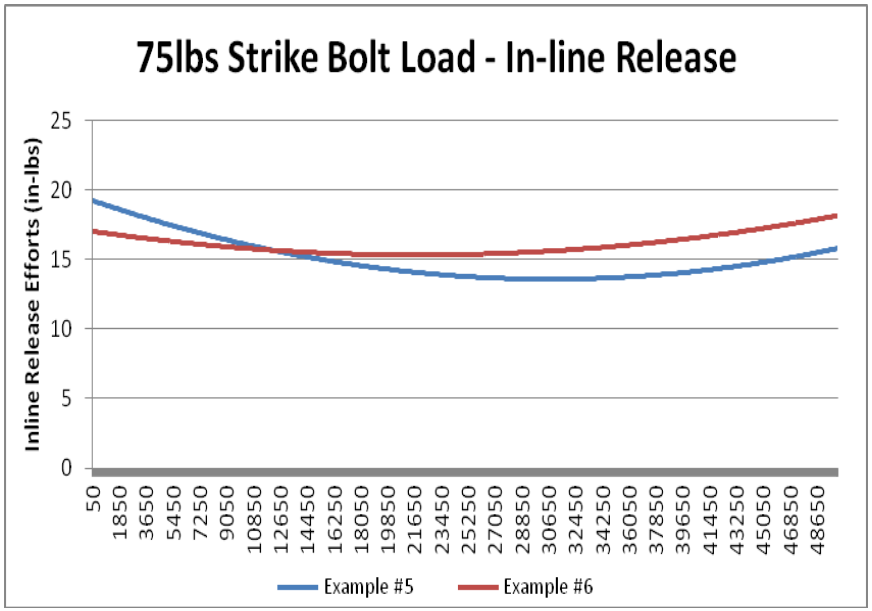

22.68kg Strike Bolt Load - External Release
External Release Efforts (N-m)
3
2.5
2
1.5
1
0.5
0
50
1850
3650
5450
7250
9050
10850
12650
14450
16250
18050
19850
21650
23450
25250
27050
28850
30650
32450
34250
36050
37850
39650
41450
43250
45050
46850
48650
Example #3
Example #4

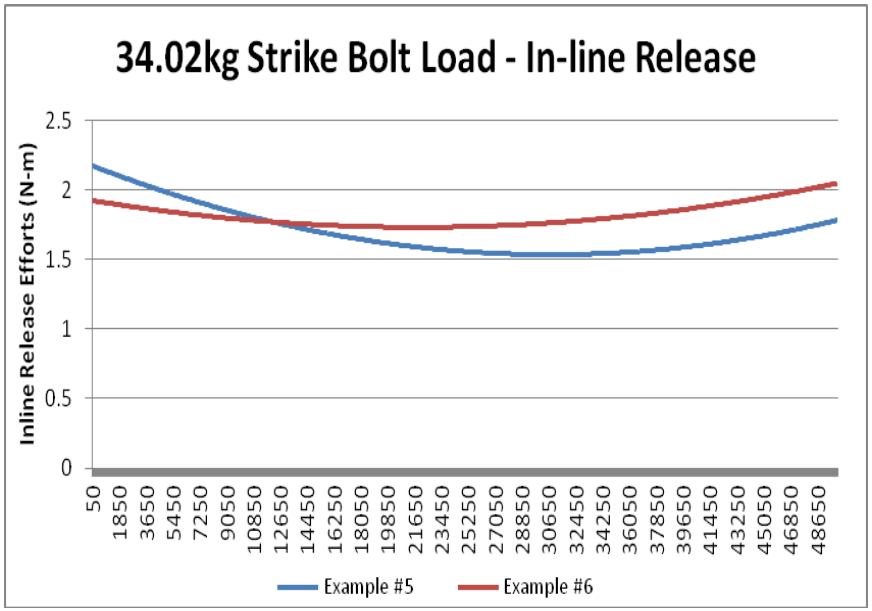

50lbs Strike Bolt Load - In-line Release
Inline Release Efforts (in-lbs)
18
16
14
12
10
8
6
4
2
0
50
1850
3650
5450
7250
9050
10850
12650
14450
16250
18050
19850
21650
23450
25250
27050
28850
30650
32450
34250
36050
37850
39650
41450
43250
45050
46850
48650
Example #3
Example #4

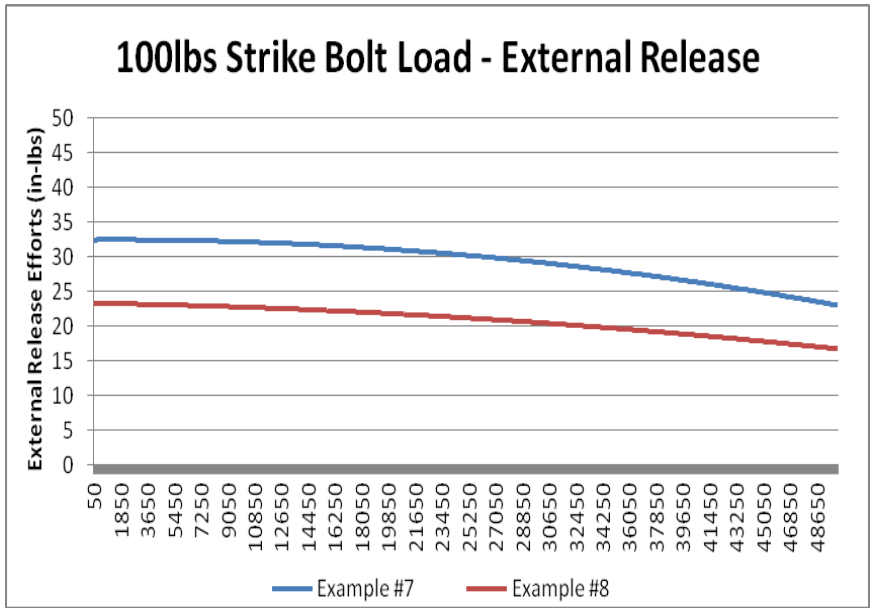

22.68kg Strike Bolt Load - In-line Release
Inline Release Efforts (N-m)
2
1.8
1.6
1.4
1.2
1
0.8
0.6
0.4
0.2
0
50
1850
3650
5450
7250
9050
10850
12650
14450
16250
18050
19850
21650
23450
25250
27050
28850
30650
32450
34250
36050
37850
39650
41450
43250
45050
46850
48650
Example #3
Example #4

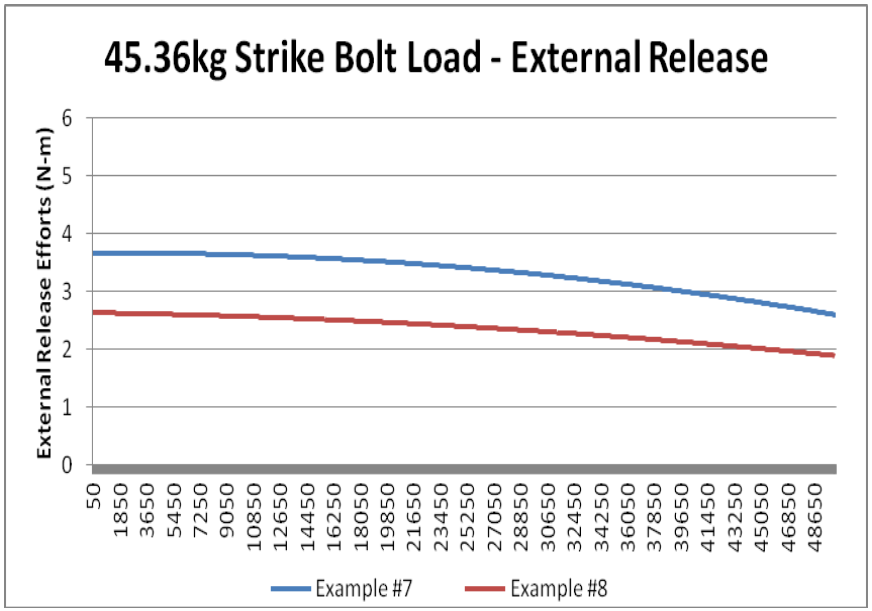

75lbs Strike Bolt Load - External Release
External Release Efforts (in-lbs)
35
30
25
20
15
10
5
0
50
1850
3650
5450
7250
9050
10850
12650
14450
16250
18050
19850
21650
23450
25250
27050
28850
30650
32450
34250
36050
37850
39650
41450
43250
45050
46850
48650
Example #5
Example #6

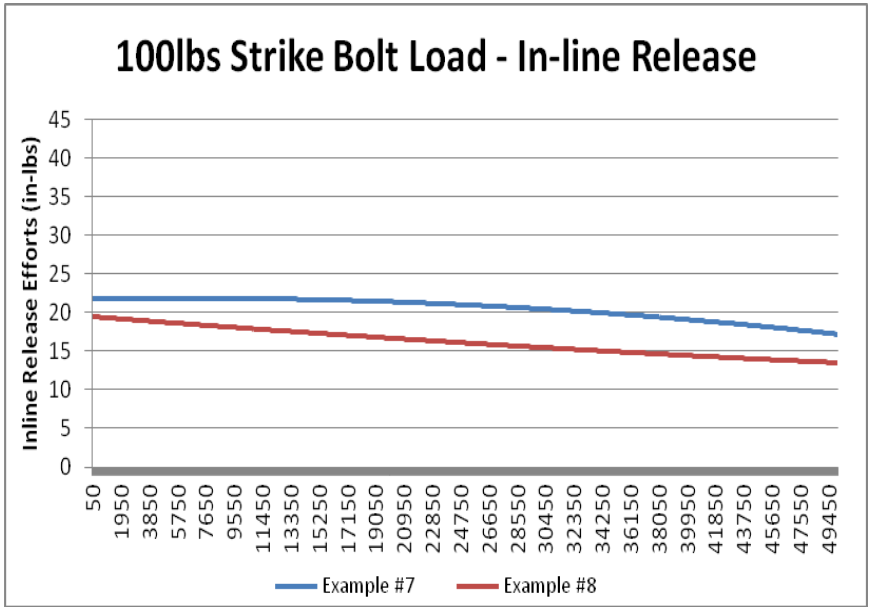

34.02kg Strike Bolt Load - External Release
External Release Efforts (N-m)
4
3.5
3
2.5
2
1.5
1
0.5
0
50
1850
3650
5450
7250
9050
10850
12650
14450
16250
18050
19850
21650
23450
25250
27050
28850
30650
32450
34250
36050
37850
39650
41450
43250
45050
46850
48650
Example #5
Example #6

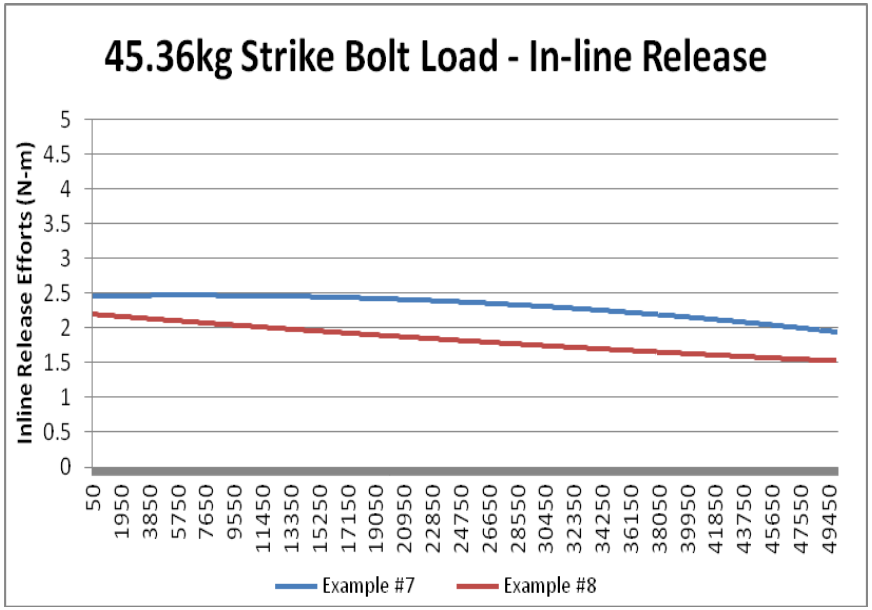

75lbs Strike Bolt Load - In-line Release
Inline Release Efforts (in-lbs)
25
20
15
10
5
0
50
1850
3650
5450
7250
9050
10850
12650
14450
16250
18050
19850
21650
23450
25250
27050
28850
30650
32450
34250
36050
37850
39650
41450
43250
45050
46850
48650
Example #5
Example #6

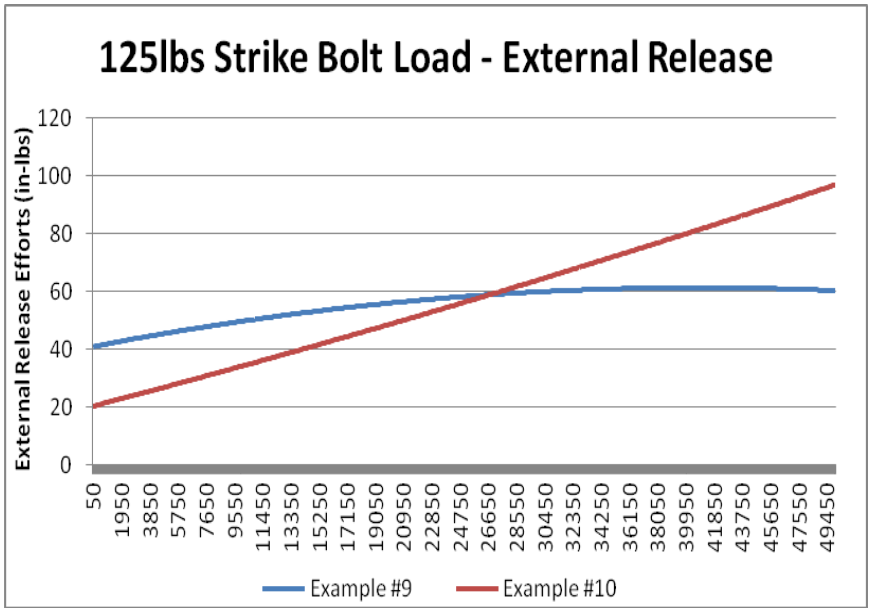

34.02kg Strike Bolt Load - In-line Release
Inline Release Efforts (N-m)
2.5
2
1.5
1
0.5
0
50
1850
3650
5450
7250
9050
10850
12650
14450
16250
18050
19850
21650
23450
25250
27050
28850
30650
32450
34250
36050
37850
39650
41450
43250
45050
46850
48650
Example #5
Example #6

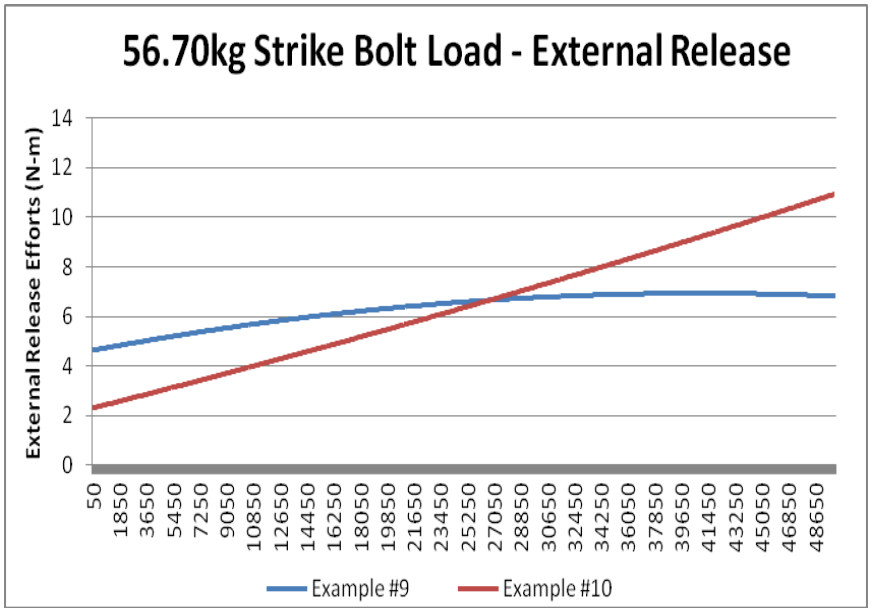

100lbs Strike Bolt Load - External Release
External Release Efforts (in-lbs)
0
5
10
15
20
25
30
35
40
45
50
50
1850
3650
5450
7250
9050
10850
12650
14450
16250
18050
19850
21650
23450
25250
27050
28850
30650
32450
34250
36050
37850
39650
41450
43250
45050
46850
48650
Example #7
Example #8

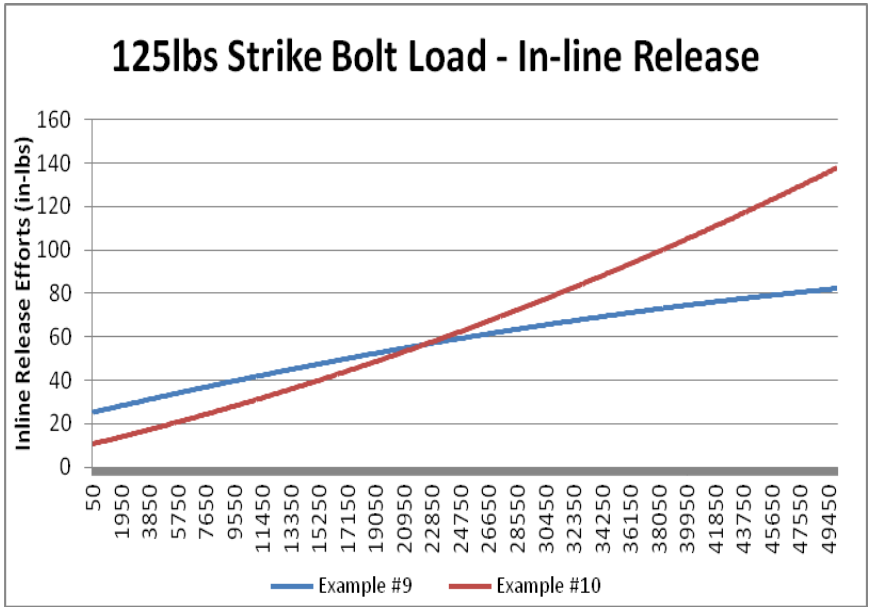

45.36kg Strike Bolt Load - External Release
External Release Efforts (N-m)
0
1
2
3
4
5
6
50
1850
3650
5450
7250
9050
10850
12650
14450
16250
18050
19850
21650
23450
25250
27050
28850
30650
32450
34250
36050
37850
39650
41450
43250
45050
46850
48650
Example #7
Example #8

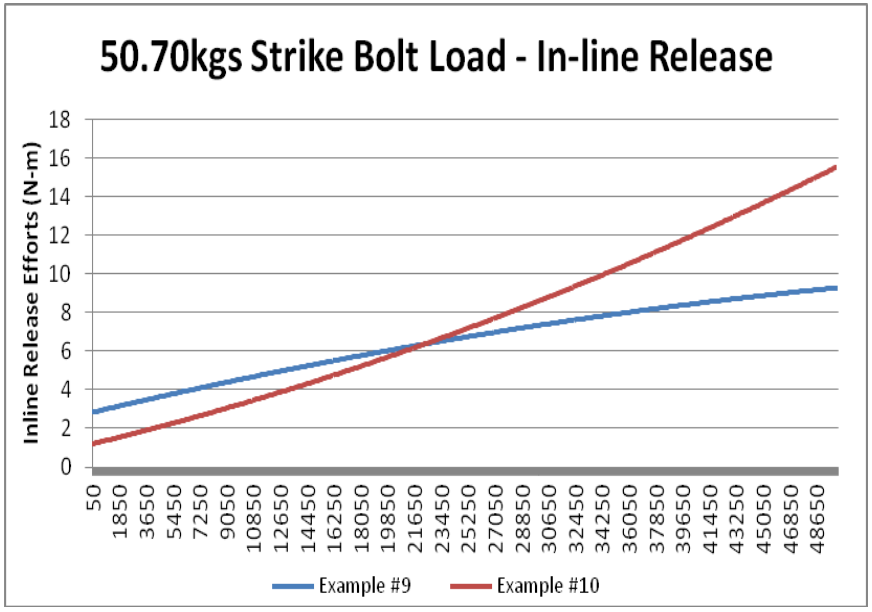

100lbs Strike Bolt Load - In-line Release
Inline Release Efforts (in-lbs)
0
5
10
15
20
25
30
35
40
45
50
1950
3850
5750
7650
9550
11450
13350
15250
17150
19050
20950
22850
24750
26650
28550
30450
32350
34250
36150
38050
39950
41850
43750
45650
47550
49450
Example #7
Example #8

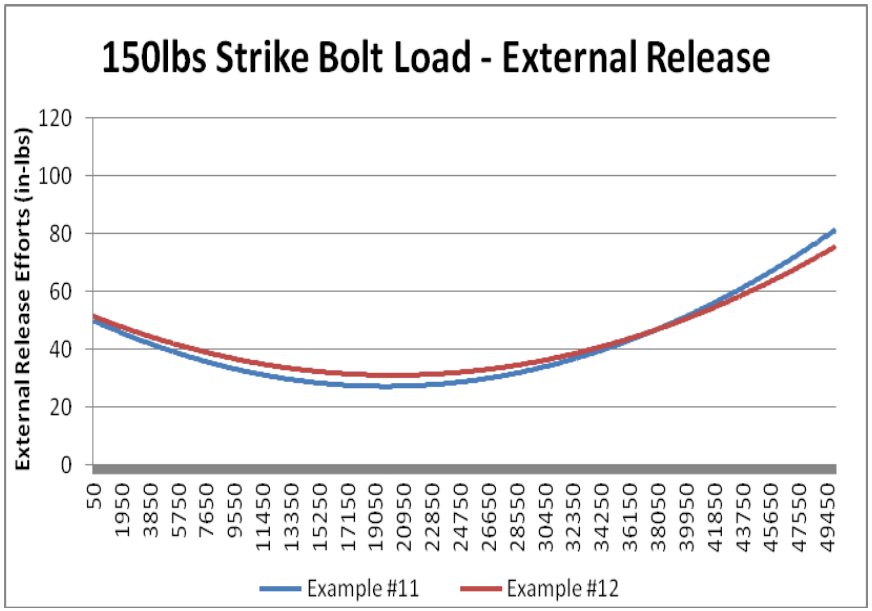

45.36kg Strike Bolt Load - In-line Release
Inline Release Efforts (N-m)
0
0.5
1
1.5
2
2.5
3
3.5
4
4.5
5
50
1950
3850
5750
7650
9550
11450
13350
15250
17150
19050
20950
22850
24750
26650
28550
30450
32350
34250
36150
38050
39950
41850
43750
45650
47550
49450
Example #7
Example #8

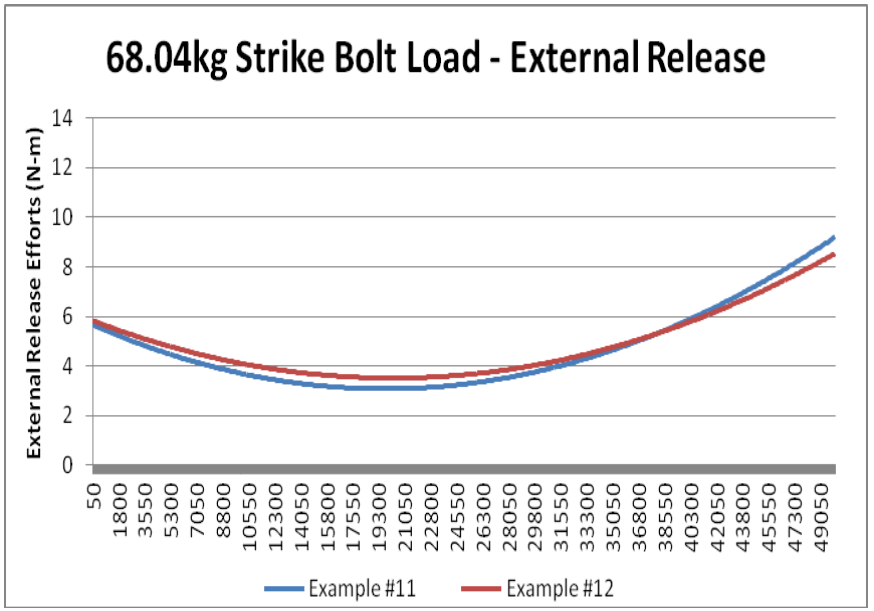

125lbs Strike Bolt Load - External Release
External Release Efforts (in-lbs)
0
20
40
60
80
100
120
50
1950
3850
5750
7650
9550
11450
13350
15250
17150
19050
20950
22850
24750
26650
28550
30450
32350
34250
36150
38050
39950
41850
43750
45650
47550
49450
Example #9
Example #10

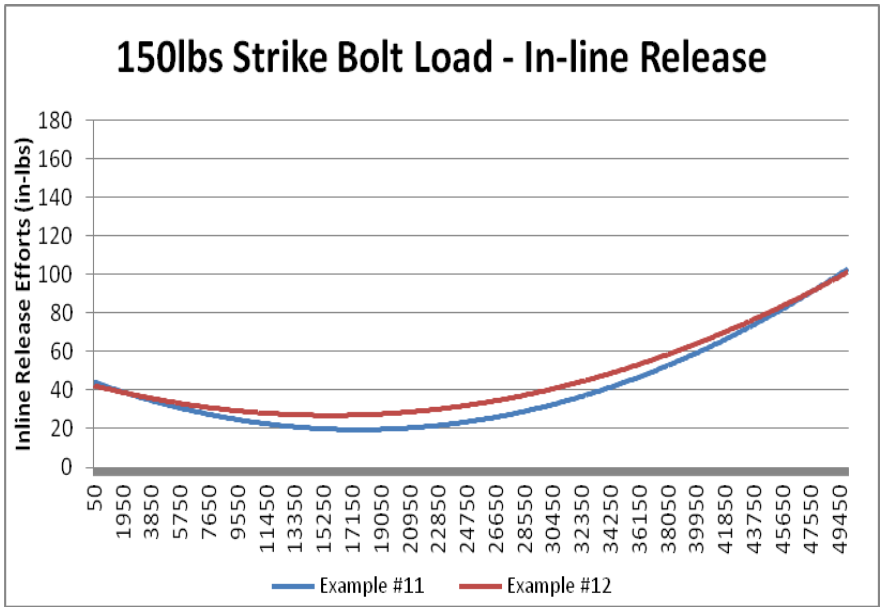

56.70kg Strike Bolt Load - External Release
External Release Efforts (N-m)
0
2
4
6
8
10
12
14
50
1850
3650
5450
7250
9050
10850
12650
14450
16250
18050
19850
21650
23450
25250
27050
28850
30650
32450
34250
36050
37850
39650
41450
43250
45050
46850
48650
Example #9
Example #10

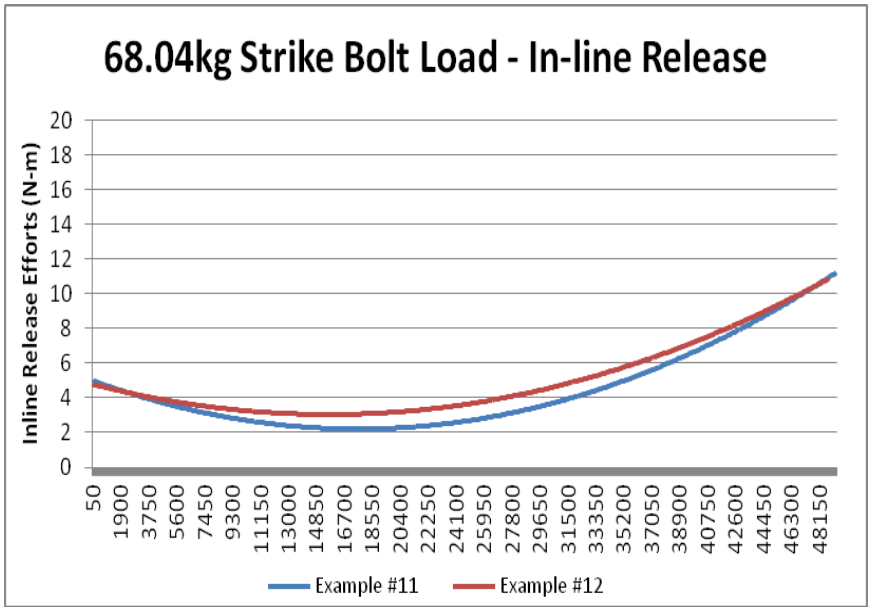

125lbs Strike Bolt Load - In-line Release
Inline Release Efforts (in-lbs)
0
20
40
60
80
100
120
140
160
50
1950
3850
5750
7650
9550
11450
13350
15250
17150
19050
20950
22850
24750
26650
28550
30450
32350
34250
36150
38050
39950
41850
43750
45650
47550
49450
Example #9
Example #10


50.70kgs Strike Bolt Load - In-line Release
Inline Release Efforts (N-m)
0
2
4
6
8
10
12
14
16
18
50
1850
3650
5450
7250
9050
10850
12650
14450
16250
18050
19850
21650
23450
25250
27050
28850
30650
32450
34250
36050
37850
39650
41450
43250
45050
46850
48650
Example #9
Example #10


150lbs Strike Bolt Load - External Release
External Release Efforts (in-lbs)
120
100
80
60
40
20
0
50
1950
3850
5750
7650
9550
11450
13350
15250
17150
19050
20950
22850
24750
26650
28550
30450
32350
34250
36150
38050
39950
41850
43750
45650
47550
49450
Example #11
Example #12


68.04kg Strike Bolt Load - External Release
External Release Efforts (N-m)
14
12
10
8
6
4
2
0
50
1800
3550
5300
7050
8800
10550
12300
14050
15800
17550
19300
21050
22800
24550
26300
28050
29800
31550
33300
35050
36800
38550
40300
42050
43800
45550
47300
49050
Example #11
Example #12


150lbs Strike Bolt Load - In-line Release
Inline Release Efforts (in-lbs)
180
160
140
120
100
80
60
40
20
0
50
1950
3850
5750
7650
9550
11450
13350
15250
17150
19050
20950
22850
24750
26650
28550
30450
32350
34250
36150
38050
39950
41850
43750
45650
47550
49450
Example #11
Example #12


68.04kg Strike Bolt Load - In-line Release
Inline Release Efforts (N-m)
20
18
16
14
12
10
8
6
4
2
0
50
1900
3750
5600
7450
9300
11150
13000
14850
16700
18550
20400
22250
24100
25950
27800
29650
31500
33350
35200
37050
38900
40750
42600
44450
46300
48150
Example #11
Example #12

## 1.1. Technical Product Information

The following ***Technical Product Information*** is available by clicking the links below to direct you to the applicable pages on Tri*M*ark Corporation's website. These can also be found under the Products Tab of Tri*M*ark Corporation's home page.

***Door Hardware Design and Consideration***

***Strength Guidelines***

***Loads on Rotary Door Latching***

***Measuring DCF (Door Closing Force) and SBL (Striker Bolt Load)***

***Guidelines for Mounting Torque***

***Latch and Striker Installation***

***Finishes***

***Materials***

***Lubrication***

***Glossary of Terms***