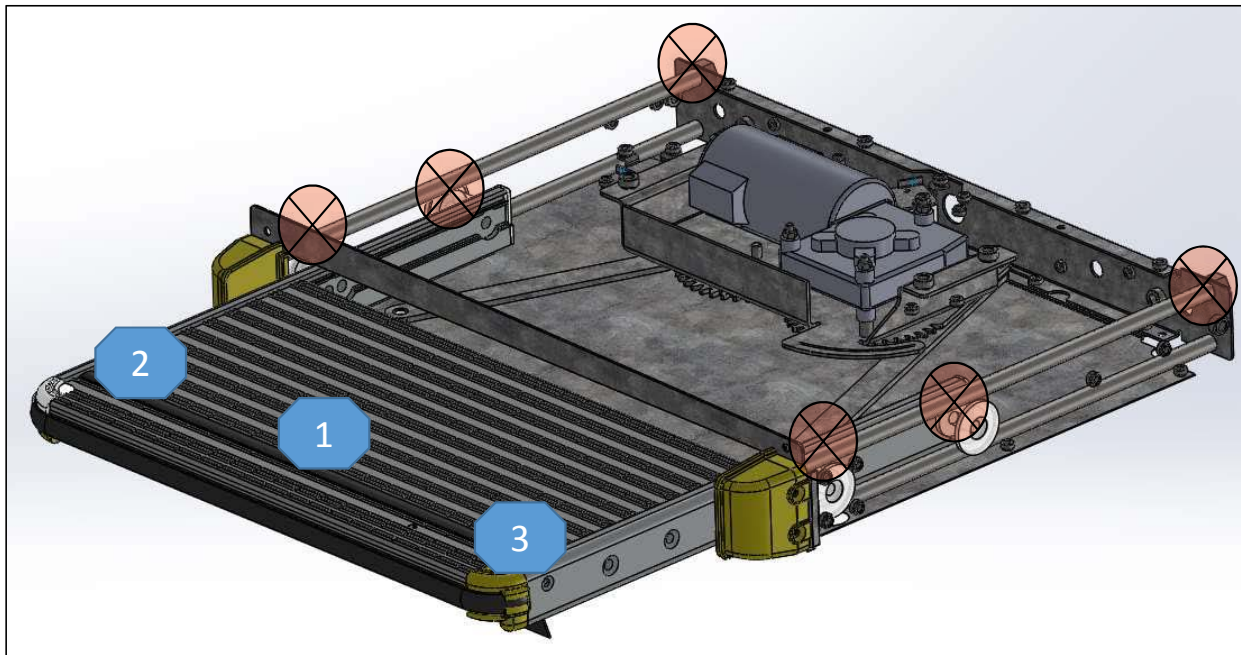






AVS EXE Step Series

AVS EXE Test and Evaluation Report

AVS Steps EXE Design Overview



 = Main stress points during operation in the deploy position

 = Area of applied weight

AVS Steps Ltd EXE Step Design

This product has been developed in line with industry legislation and risk based analysis.

Industry Legislation defines the Safe Working Load as 7.6.10.9. when the passenger door is open, the retractable step shall be securely held in the extended position. When a mass of 136 kg is placed in the centre of a single step or a mass of 272 kg is placed in the centre of a double step the deflection at any point on the step shall not exceed 10mm

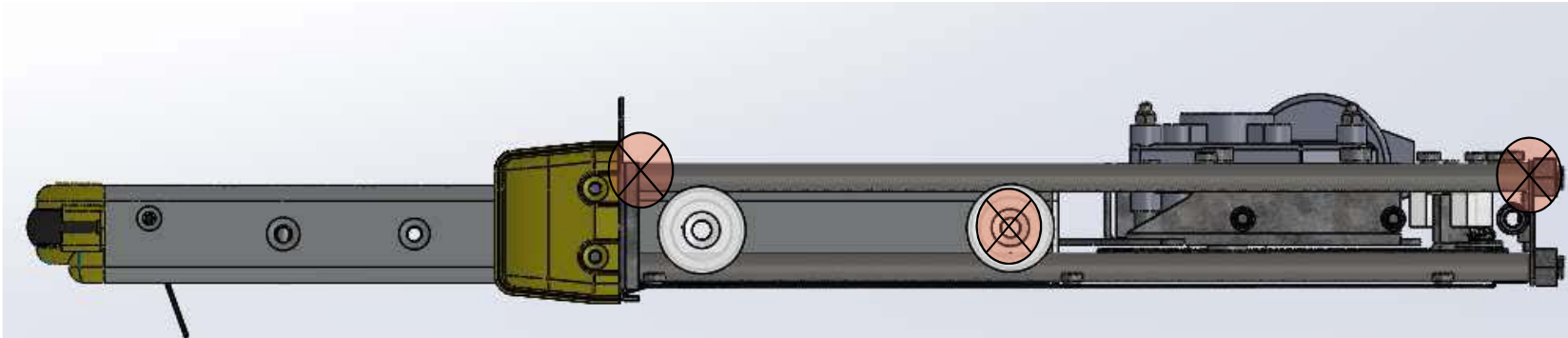
AVS Steps Ltd look further into the provisions made by legislation and take a risk based evaluation on the design of its Steps.

Firstly AVS Steps evaluate the weight distribution within the step design. Highlight the load points and potential areas of first failure(6), a risk based methodology is used to determine how this area can be stressed and Design Review is used to look at balancing the weight distribution throughout the step.

Secondly real world activity is assessed through risk based methodology and confirmed through physical testing.

Load points defined by AVS Steps are from the design of AVS Steps EXE series and are for this product only.

AVS Steps EXE Design Overview



AVS Steps Ltd EXE Step Design

Area's Highlighted (6) 3 main points on each side is the load bearing points through this step design. AVS have balanced the load points through design and manufacture to ensure weight transfer is balanced and therefor reduces normal and impact stress from this area.

The area is both Left and right side of the step, Tread design is paramount in the load distribution.

AVS Steps EXE Test Overview

Test Method and Methodology

AVS Benchmark – 250Kg \leq 8mm Deflection – Industry Safe Working Load for standardised acceptable use (centre)
AVS Risk based methodology ensures safety as standard and for improper use areas - 250Kg \leq 10mm Deflection

In 2014 150kg SWL was considered adequate but 250kg SWL is now considered as the minimal acceptable .

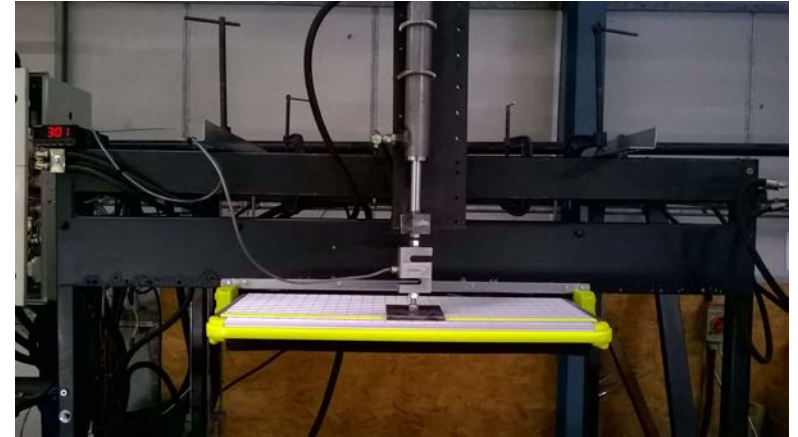
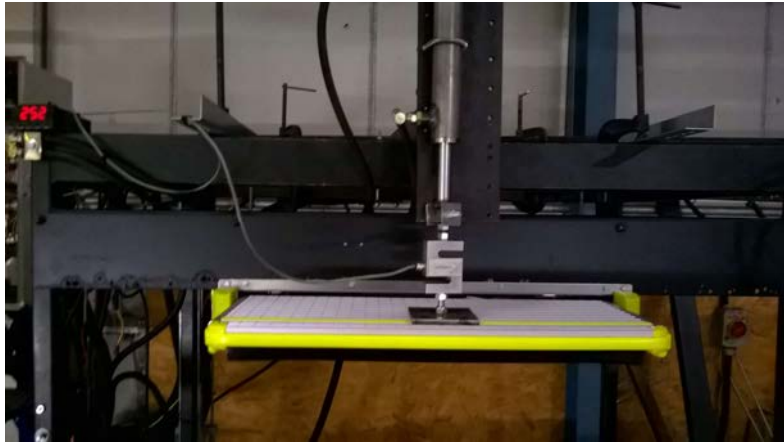
- An initial load test on the centre of the tread from 250kg \pm 5kg in increments of 50Kg and 100kg to a maximum of 500kg
 - 136kg at max 10mm deflection is defined within industry standard for normal operations.
 - 100mm square is the load area, the test area is centre of the step.
 - 100mm square load area is then placed at the side of the step affecting the load bearing point's to maximum stress
 - This is a test derived from improper use risk assessment.

Improper Use Risk Assessment.

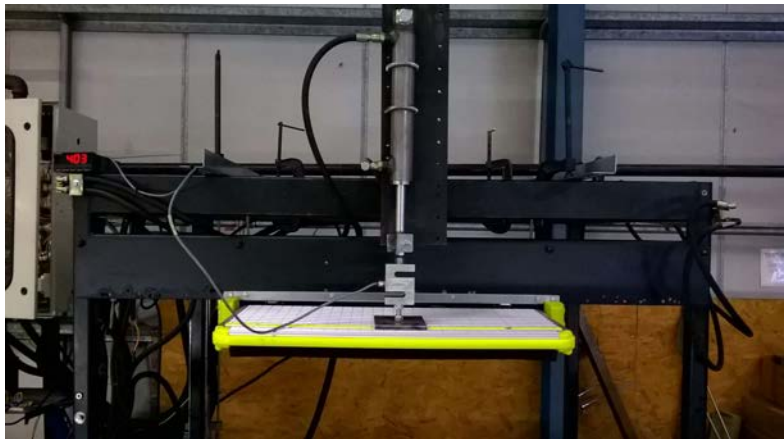
AVS Steps Ltd take safety as a primary aspect within the design and manufacture of their steps, the implementation of risk based assessments within the design and manufacture of their steps has developed into an ideology of best in class. AVS Steps Ltd take the aspects associated with improper use and apply destructive test.

AVS Steps EXE Design Evaluation Test

EXE Step design was tested to 500Kg to destruction.



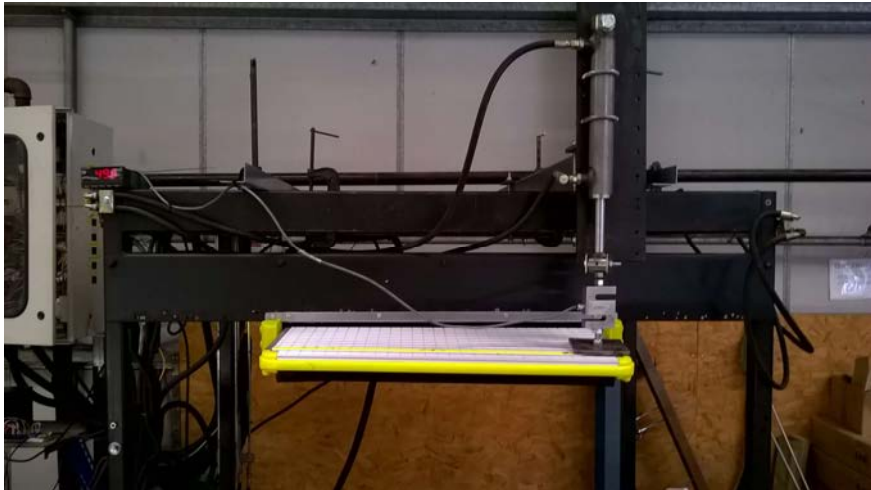
EXE Design Takes
250Kg, 300Kg,
400Kg, 500Kg in
the area of
acceptable use
"centre"



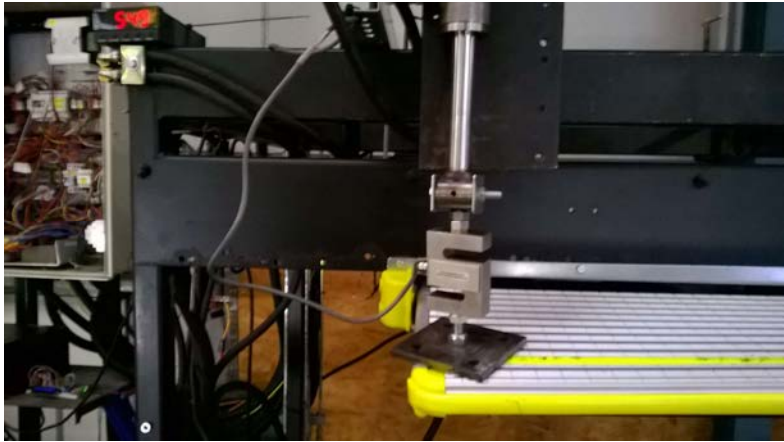
AVS Steps EXE Design Evaluation Test



400 kg and 500 kg loaded onto the area that has the highest stress on the load bearing points.



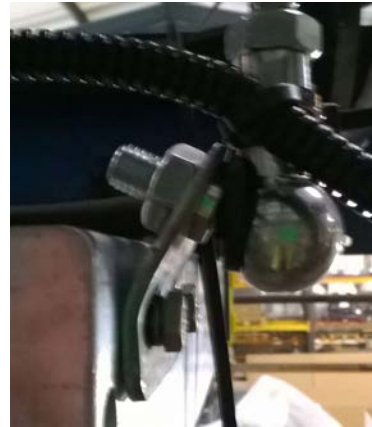
AVS Steps EXE Design Evaluation Test



AVS Steps continue to test the load bearing points where improper use would strain the design.

At 500kg the EXE design shows stress; the deflection is $\leq 15\text{mm}$
At 600kg the EXE design shows deflection $>15\text{mm}$ and signs of physical damage to the frame (not the step).

The step stress relief by design has been justified as the physical damage by stress is evident on the mounting frame only.



AVS Steps EXE Design Test Verification Table

Test Sequence	Area of Test	Load Kg	Cycles	Deflection mm	Comments
1	A	250	100	8	
2	A	300	100	10	
3	B	250	100	9	
4	C	250	100	10	
5	C	300	100	12	
6	B	300	100	11	
7	A	400	25	14	
8	B	400	25	14	
9	C	400	25	15	
10	A	500	25	15	
11	B	500	25	15	
12	B	500	25	15	
13	B	550	25	16	
14	A	600	25	16	
15	B	600	25	18	
16	C	600	25	19	Physical damage to test frame cannot continue with test.

↑
Test's to and beyond industry standard including improper use test.

↓
Test to destruction including improper use area's