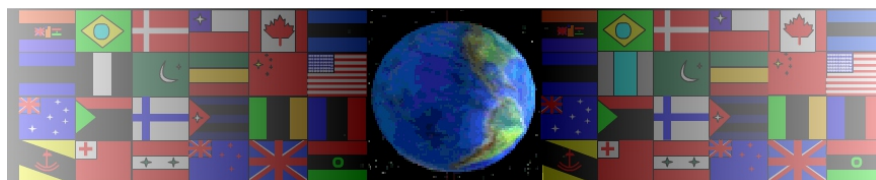


TESTING OF FINAL DEVELOPED IDEA

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On behalf of The World Association of Technology Teachers

W.A.T.T.



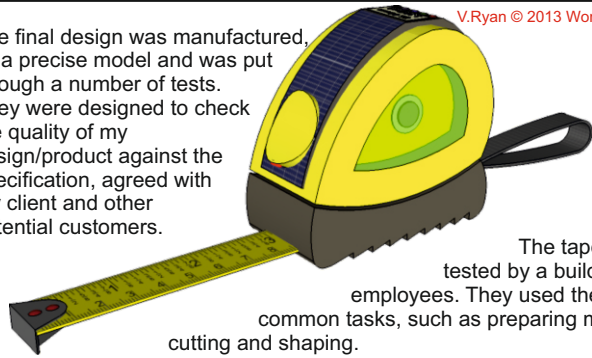
World Association of Technology Teachers

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The final design was manufactured, as a precise model and was put through a number of tests. They were designed to check the quality of my design/product against the specification, agreed with my client and other potential customers.



GENERAL TESTING

The tape measure was tested by a builder and his four employees. They used the tape on common tasks, such as preparing materials for cutting and shaping.

Their all agreed that the tape measure had potential for future development. Four of the five workers said it was comfortable to use, especially when held in the hand, as shown below. One suggestion was that two versions should be developed, one with an LED light and one without.



ERGONOMICS TESTING

PHOTO A



PHOTO B



An ergonomics test, was one of the most important aspects of the testing and evaluation, of the final tape measure design. It was tested in two 'dimensions';

A - Holding the tape, as it would normally be held for setting up for measuring.
B - Holding the tape measure and operating the LED rocker switch.

A Focus Group composed of ten people were asked to test the ergonomics. Seven members found the ergonomics to be 'very good', three found the ergonomics to be 'good'. Overall, I am pleased with the general findings of the focus group, as the specification stated that good ergonomics was a priority.

SCALE - READABILITY TEST



The builders carrying out the general test, agreed that the scale was very useful, especially the imperial scale. The imperial scale has been used less and less, over the years, due to the metric system becoming dominant. When used by builders, the fact that the imperial divisions were clear and easy to read, was a plus. This meets one of my specification requirements.

GROUP MEMBER	VERY GOOD	GOOD	FAIR	POOR
1	✓			
2		✓		
3	✓			
4	✓			
5		✓		
6	✓			
7	✓			
8	✓			
9		✓		
10	✓			
SUMMARY	7	3	0	0

LED LIGHT TEST

A general test and a scientific test were carried out.

The tape measure was used in a shaded place, to test the illumination of the LED and the ability of a user to view the measuring scale.

A light meter was used to measure the light intensity of the ultra bright LED

All members of the focus group found the LED illumination very useful, when measuring in poor light conditions. One suggestion was that the LED could be used as a general light source.

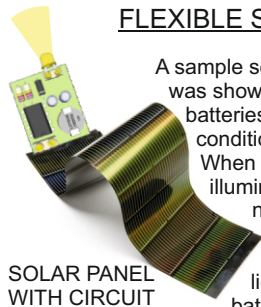
FLEXIBLE SOLAR PANEL TEST

A sample solar panel was tested and it was shown capable of recharging the batteries, in normal lighting conditions, in one hour.

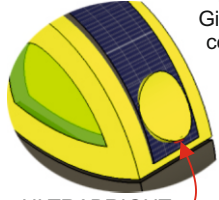
When tested for discharge, it illuminated the LED for 10 minutes nonstop use. The manufacturers claim that the panel collects 90% of ambient light, efficiently charging the batteries.

Given that the LED will not be constantly used and that the tape measure would normally be in room level lighting conditions - the conclusion is that this illumination system will be successful.

The environmental aspect of my specification has been partly met.



SOLAR PANEL WITH CIRCUIT



ULTRABRIGHT LED

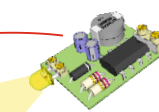
TM-201L LUX/FC LED LIGHT METER

I used the light sensor to find the LED white light Luminous Intensity Measurement.



The circuit was tested, outside the casing, shining the LED light directly at the light meter. The LED achieves 1270 lux, providing enough light to view the scale in darkness.

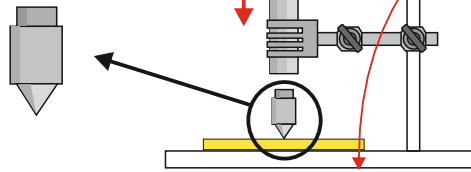
The use of an LED to illuminate the tape, helps meet the specification requirement 'ease of reading' and aids accuracy.



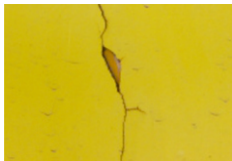
MATERIAL TESTING

HARDNESS TEST

A sample of styroflex was tested using a piece of homemade equipment. A steel tube was held vertically, using science lab clamps. A 'turned' 100g weight was dropped down the tube and the impact damage recorded.



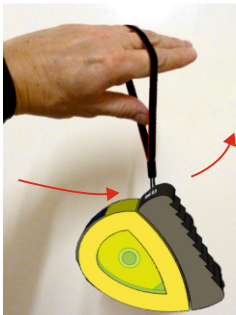
The styroflex sample had a 'dint', where the impact took place, but it had not cracked. Overall, very little deformity took place.



The equivalent size and thickness of a piece of HIPS High Impact Polystyrene was tested, in exactly the same way. The piece cracked from the impact area outwards and a small piece broke away at the impact point.

Conclusion: the Styroflex was the most appropriate material to select for the casing of the tape measure. Survival of knocks and drops from everyday use was more likely. Styroflex fits the material properties outlined in my specification.

SWING TEST

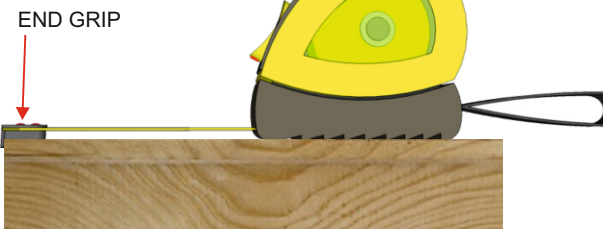


The kevlar strap of the model was put under stress, by swinging the tape measure round at speed. Although not scientific, it is a realistic test, as this may happen during its lifetime. The strap survived and showed no sign of fatigue. This was repeated fifty times.

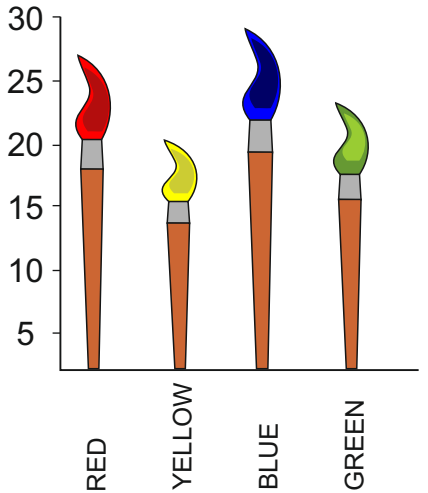
CONDUCTIVITY TEST



I carried out a simple conductivity test on a sample of casing material (styroflex). The meter showed that it did not conduct current at all, making it an excellent insulator. Although the low voltage batteries do not carry a direct health and safety risk, the styroflex, will prevent an accidental short circuit, which is a potential fire hazard.



END GRIP

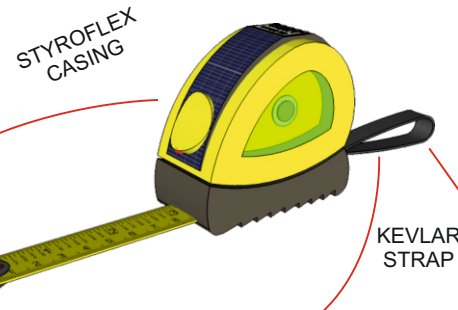


COLOUR SELECTION

I showed one hundred construction students at the local college, the range of colours on offer. The selection of colours was well received, with blue being the most popular.

When asked if the colour scheme was the most important factor or the operation / functions, 92 said that the tape measures operation/functions were the priority.

My specification states that the colour scheme will be important. However, the survey suggests function before aesthetics in of greater importance.



TESTING KEVLAR

When testing a sample of kevlar, with a scissors, I found that it was extremely difficult to cut and after a short time the scissors became blunt.



TESTING RUBBER

When testing rubber, it cut extremely easily with a scissors. Very little effort was required.

TAPE EXTENSION TEST



92mm

The tape was extended stage by stage and a weight of 50 grammes attached. The tape stayed level until it was extended by 92mm, it then lost its shape. The focus group agreed that this was acceptable, as most tapes they had used, failed even at a light touch. This fulfils a specification requirement.

Tape extension is very important as a 'weak' tape, that loses its shape, leads to a loss in accuracy and infuriates the user. The specification refers to this aspect of the design being important.

END GRIP TEST

A standard problem emphasised in the specification, is that the tape end grip tends to slip off the material. This usually happens, just when it is time to read the scale. An improved design was specified.

The redesigned end grip worked well when tested. In 9 out of 10 tests, the end grip remained in position whilst the tape was being used, on a typical measuring task.

The metallic tape remained straight and level when in use, allowing a more accurate measurement.