

# Why developing your Mental Toughness is important.



I thought I would use my engineering competencies (I was a Chemical Engineer a long time ago) in terms of “strengths of materials” to look at why Mental Toughness is as important as Metal Toughness

First some definitions from the world of strengths of materials

## **Pressure**

Pressure is defined as force per unit area applied to an object in a direction perpendicular to the surface.

## **Strain**

When metal is subjected to a force (i.e. pressure) it becomes distorted or deformed, no matter how strong the metal or how small the force.

To be exact, it is the atomic structure of the metal that is impacted; each metal has its own specific geometric arrangement of its atoms. The atoms within the atomic structure, under normal conditions, are organised in a “minimum energy state” and it is this minimum energy state that is changed under pressure.

The intensity of the distortion or deformation is called

*strain*; if the force was small and the metal returns to its original form the strain is called “elastic strain” and if the force was large and the metal remains deformed the strain is called “plastic strain”.

## **Stress**

Stress is the internal resistance or counterforce of a metal to the distorting effects of the external force. This counterforce tends to return the atoms to their “preferred” geometric arrangement.

### **To summarise:**

We have external forces caused by increased pressure and internal forces caused by resistance to the external forces.

Now, let’s take a look at a practical example. As I spend a lot of time in the world of aeronautics, I am going to use the example of an aircraft wing.

If any stress engineers are reading this I apologise for short cuts.

When the aircraft is stationary on the ground, the pressure on the wing is relatively low, hence no, particular strain and little stress. As soon as the aircraft starts moving, the wing is subjected to increased pressure and hence strain sets in; the internal forces (the stress) will “fight” to keep the wing under the best possible operating conditions.

As the aircraft takes off the external forces increase significantly and hence strain and stress will increase. There could come a point where the force on the wing is so great that the strain is no longer counterbalanced by the stress and the wing could rupture and cause an accident; however, this doesn’t happen

**So why doesn’t this happen?**

Wings are designed by engineers who understand strengths of materials; they will have chosen highly resistant and “tough” materials (all materials are tough, but some are tougher than others), they will have strengthened and “toughened” certain parts of the wing, they will have reinforced the parts of the wing more “exposed” to pressure and they will have tested the wings under extreme conditions to insure the overall “wellbeing” of the wing.

**Again, a short summary:**

External conditions lead to pressure on the wing, which in turn causes internal strain and hence stress, if the pressure is too great the metal in the wing will experience fatigue and the wing will cease to perform as expected. Reduced performance can lead to rupture and a possible accident.

Now, let’s take a look at how we, people, deal with pressure, stress, strain, etc and how we can insure our overall wellbeing.

There you are, sitting at your office desk first thing in the morning, you are the first in, it’s quiet and you are looking through your “to do” list – little pressure to start the day.

As the day starts moving, events (external forces) start happening; difficult meetings, project deadlines, having to reprimand someone, your boss needing to see you urgently, your spouse texting you to say that you need to pick up your son from school, the report you need to finish, a colleague who needs to talk to you, etc. etc. The pressure, for us, is the build-up of all those “external events”.

As the day gets really moving, strain sets in and our ability (elasticity) to absorb the pressure caused by our external events causes stress; our internal, “biological” reaction to counterbalance the strain. We start secreting Adrenalin, Cortisol, Norepinephrine and the like and, if we reach the point where there is too much pressure and we are under too

much strain, we can become so stressed that we have an accident.

There is, obviously, a big difference between an aircraft wing and us.

Aircraft wings are fairly “predictable” in how they will perform under pressure and when they will rupture, we are much less predictable and no two people will react exactly the same way to pressure.

However, we are similar to an aircraft wing in that we can “toughen” ourselves; engineers will use tempered metals, reinforced hinges, toughened fasteners, etc, i.e. they will work on the different components of the wing. Just as we can work on and develop the different components of our own Mental Toughness; we can develop the **Control** we have over our lives, we can develop our **Commitment** to getting things done, we can develop our capacity to get out of our comfort zone and seek **Challenge** and we can develop the **Confidence** we have in our skills and in ourselves.

Studies have shown that Mental Toughness contributes to positive behaviour, increased performance and better wellbeing.

If you would like to read more about Mental Toughness you can do so here: [www.boblarcher.com/category/mental-toughness/](http://www.boblarcher.com/category/mental-toughness/)

If you would like to evaluate, explore and develop your Mental Toughness, do not hesitate to contact me at [boblarcher@boblarcher.com](mailto:boblarcher@boblarcher.com)