

Engineering graduates. Job ready?

Presented by Paul van de Loo

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to the National Committee on Engineering Design

Applidyne Australia

Consulting Engineers

www.applidyne.com.au

We have worked on projects on a number of products across a variety of industries including:

- Medical
- Consumer products



Hospital Bed Lifter



Tank Analysis and Design



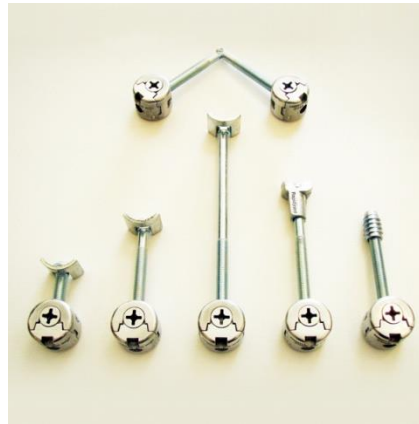
Smart Blind Controller



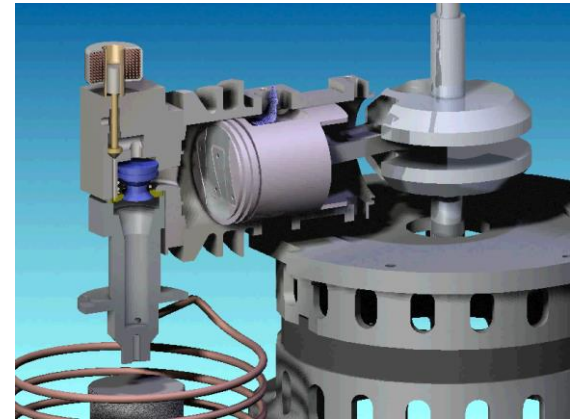
- Mining
- Building products
- Control Systems
- Energy



Vehicle structures, dynamics and control



Timber Joining System



Waste Heat Recovery Engine

- Military
- Automotive



Compact Mine Detector



Folding Mirror Mechanism

Specialised vehicle components and systems:

- Mechanisms
- Suspension design and testing
- Hydraulic and electro-hydraulic systems
- Structures, FEA



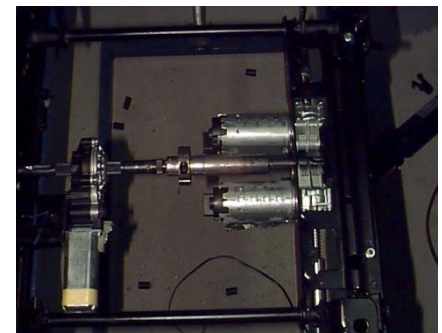
Folding mirror
mechanism



Truck suspension
improvements



Active suspension
system



Automotive power seat
track

Feral cat grooming trap



Minister for the Environment, Greg Hunt, trying it out

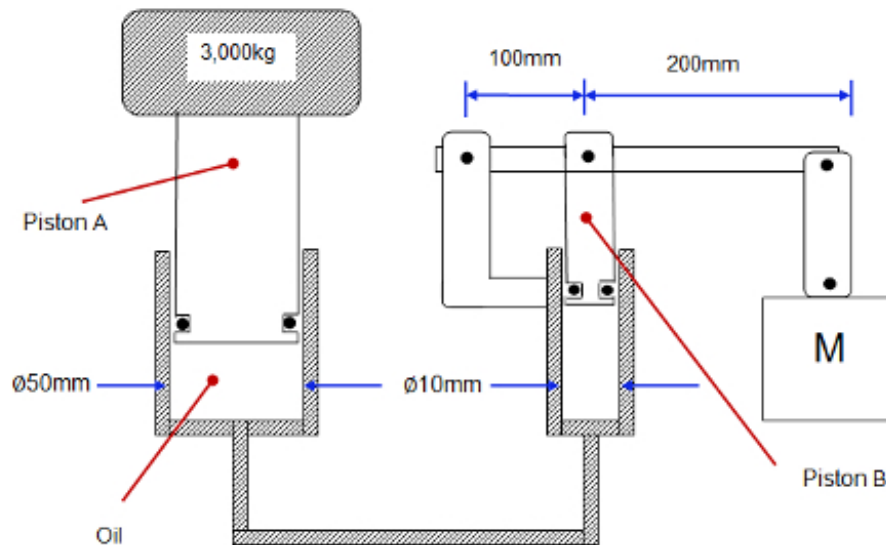
Engineering graduates. Job ready?

- Do we want them to be?
 - Yes and No
- Yes:
 - Fundamentals
 - Have learnt how to learn
 - “Real world” savvy
- No:
 - Management
 - OHS

Our test

Scholarship test

- Aptitude



If M has mass 40kg which way will it move when the $3,000\text{kg}$ mass is placed gently on the piston 'A'.

Our test

Scholarship test

- Relevant general knowledge



List the main components of a lawnmower and describe the operation and function of each. (You should aim for 5 components)

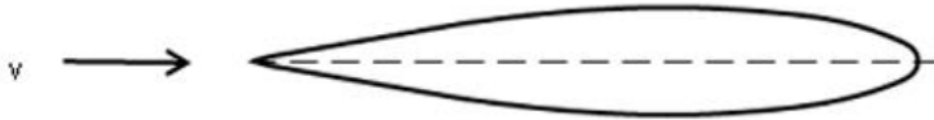
Our test

Scholarship test

- More specific understanding

Question 6 of 27

Orientation A



Orientation B



A symmetrical airfoil is aligned with an airflow. Which orientation (A) or (B) above will have the least drag?

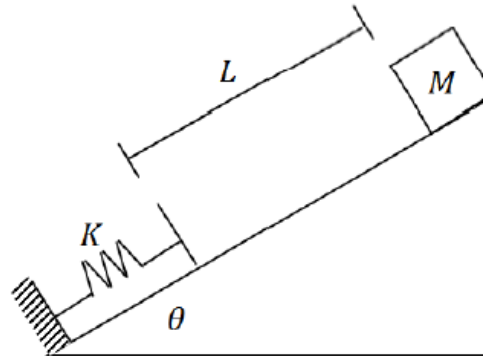
Why? Assume that the air velocity v is 100km/h, the air is at standard atmospheric conditions and the length of the airfoil is 1m.

Our test

Scholarship test

- Problem solving

Question 6. Spring deflection



Find an expression for the maximum deflection in the spring caused by the mass sliding down the slope. Assume that the coefficients of static and dynamic friction equal 0.1, i.e. $\mu_k = \mu_s = 0.1$ and that on this planet the acceleration due to gravity $g = 10\text{m/s}^2$

Our test

Scholarship test

- Creativity

Question 10 of 14

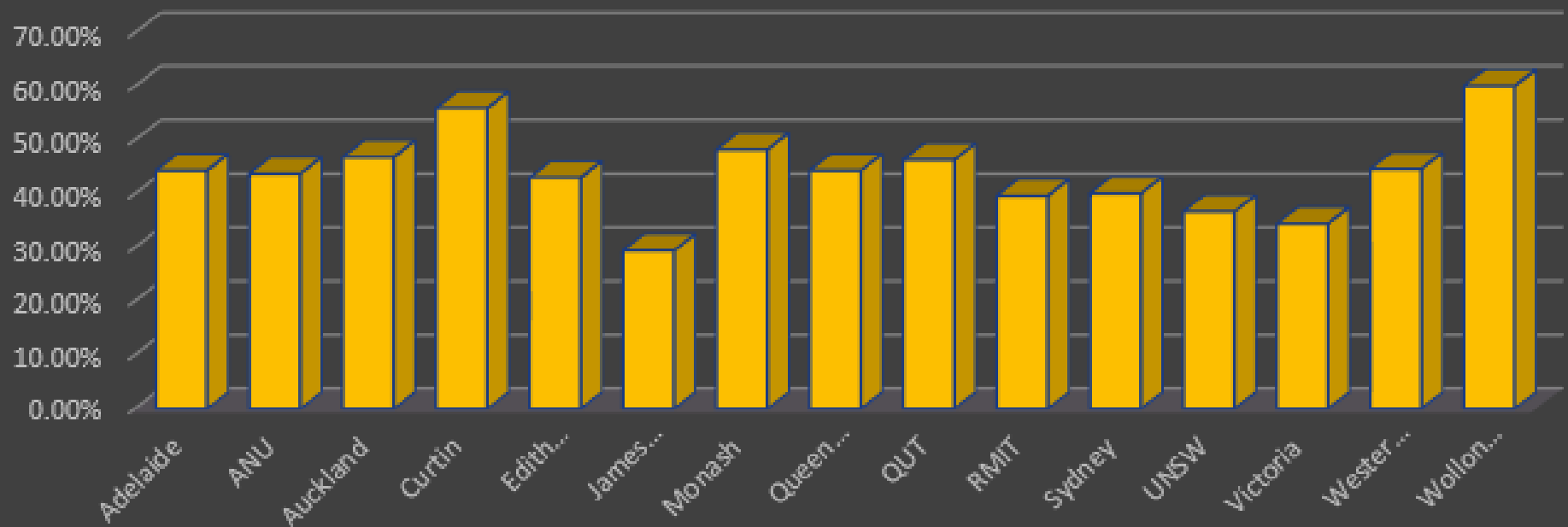


A client has tasked you to design a set of handcuffs for an octopus.

Sketch 3 concepts that may be suitable.

Which Uni does the best job?

Applidyne Engineering Design Scholarship Comparison of Results by University Median 2015/2016



29 universities participated in 2016. 14 Universities did not have more than 3 participants on average in 2015 and 2016 and so are not included here.

Which Uni does the best job?

Rank	University
1	Wollongong
2	Curtin
3	Monash
4	Auckland
5	QUT

What do they wish they knew on graduation?

What our recent graduates told us:

Steve:

1. The formal design process; spec, concept & selection, prelim (risk mitigation) & PDR, detail & DDR, prototype, critical & CDR.
2. Geometric tolerancing – didn't learn at all.
3. Tolerance analysis – particularly RMS method to determine feature sizes!
4. How to interact with manufacturers, what file types to give them to have parts made, what accuracy could be expected from different processes, etc. Ideally students would have a project where they had to design and order a machined part on their own. We never really "closed the loop" on the manufacturing side, this would really help for projects like Warman. Probably perfect to mention in a Warman presentation...
5. CAD, ANSYS, DDS (same as Kade below). DDS is a particularly great one – if you could throw some of those around at Warman students (and lecturers) would get a real kick out of it, seeing what is done in industry.

Kade:

1. DDS system was new to me to some extent; we had used a similar sheet in some courses to log design info but not to the same level.
2. Design review process had not been implemented correctly at university, only reviews were informal chats with lecturer in passing.
3. CAD modelling was never taught to its fullest extent. Only basics; ie no surface modelling, top down design, toolkit based modelling.
4. Geometric tolerancing could be improved upon greatly.
5. Had to teach myself the more advanced ANSYS FEA features.

What do they wish they knew on graduation?

- Need skills and knowledge on how to make something work:
 - Drawings
 - Tolerances
 - Manufacturing processes
- Need a methodology to make it happen:
 - Structured design process
 - CAD, FEA tools
 - Documentation

CAD and drawings - tips

- Handout
- Download at <http://www.applidyne.com.au/index.php?select=215>

