The Transition from Student to Mechanical Engineer

Some would consider the years spent at university to be the steepest steps in learning in the overall career of a mechanical engineer. I would argue that the student years of an engineer only form half of the mountain that must be climbed towards the ascension to professional engineering status.

While at university a mechanical engineering student typically only catches a glimpse of the engineering world through the lens of academia, with focused growth in the technical fields of thermodynamics, fluid mechanics, materials strength, calculus and the various forms of computer aided design. This focused technical growth typically culminates in a final year design project, whereby these new-found skills are applied to the design process of concept formation, detailed design, prototyping or testing and finally manufacture.

Graduate engineers moving into the working environment will need to continue their steep learning ascension, this time mostly through the learning of the ‘soft skills’ required in order to be effective in the workplace. The discovery is soon made that a working engineer’s time is not their own and the priorities of clients and managers must be carefully balanced in order to produce an effective design that may pass the hurdle of financial viability.

To achieve this, a graduate engineer must adopt the mantra of ‘keep it simple’, which must be uttered at the beginning of each new project. Nothing fuels the vanity of a graduate engineer quite like the belief that what is existing and proven in the market need not be considered. The benefit of using standardised and proven equipment and techniques is a significant reduction in cost and the use of the knowledge of the engineers who have come before you.

First principles
However, a working engineer must be able to identify the level of engineering required to solve a problem to within an acceptable degree of accuracy. It may be a priority to quickly solve a solution by using proven design and empirical formula, but for more complex problems the use of first principles and Matlab type calculations must be reverted to. Although simplicity is often the most revered solution in industry, it is often the most difficult outcome to attain.

The newly graduated engineer must then extend themselves beyond the technical learning received in university and consider the more complicated variables of manufacturability, politics, material cost, trade-offs and HAZOPs.

The intuition of what equipment must be procured from overseas, or what must be produced locally cannot be taught in university. University also cannot teach the challenges involved with getting a construction crew’s equipment through the Zimbabwean boarder, nor can it teach the intricacies of identifying and managing potential risks in the execution of a project. Scenarios such as these can only be learned through experience.

The real world
It must be further considered that the product being designed will unlikely be used in the ideal world on which university models are based. In the real world, pipelines may become fouled with time, upsetting an engineer’s delicate pipeline pressure loss calculations. Instabilities in a process may be brought about by off specification material being fed into the factory. A good engineer must have the foresight to identify these potential “less than ideal” operating conditions and factor these into their calculations.

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To all the newly graduated engineers and those who are still studying, do not be discouraged. The world of mechanical engineering, especially within sub-Saharan Africa is an exciting adventure that presents many unique opportunities, that may not be known to those who are considering moving their careers abroad.

My newly emerging career at a consulting engineering firm has seen helicopter rides to project sites in near uncharted regions of Africa, the comradery of the Zimbabwian boarder, nor can it teach the intricacies of identifying and managing potential risks in the execution of a project. Scenarios such as these can only be learned through experience.

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