

## **PUMPLIGHT – A case study in Engineering Entrepreneurship.**

### **The Idea**

Dennis Naylor has been a cyclist for many years, and had become more and more frustrated with the everyday danger he faced in cycling on UK roads. He felt that the sheer volume and general impatience of cars and lorries had turned a pleasure into a chore that was sometimes bordering on dangerous. Dennis felt that some kind of safety device might help redress the balance and make cycling safer, and perhaps also have some business potential.

His breakthrough came when he thought of combining a simple safety device, a LED bicycle light with an essential tool, the pump used for tyre inflation. The idea, he figured, had several advantages over currently available products: many cyclists already end up carry both objects separately, the pump is extendable, the light could go anywhere on the pump, the device could be stored against the frame when not in use, and it could be used or not as the rider wished. Ideas can come from all kinds of sources and initially Dennis envisaged a row of oscillating LEDs, somehow inspired by the front of the car featured in the classic 80's TV series Knight Rider.

Dennis has been an engineer for a number of years and knew that his first move should be to see what was already on the market and what ideas were already patent protected. His first port of call, before even making a simple sketch of the idea, was to the nearest Patent Office. Dennis received first class help and they allowed him to browse through the on-line catalogues of existing and pending patents. Fortunately from the search it appeared that Dennis had come up with an original idea to which no-one else had yet laid claim.

### **Proven Idea**

At this stage Dennis became really enthusiastic, but at the same time cautious about the prospect of creating a new product that he felt would find a sympathetic market. Initially he sketched his idea, but later recalls that he wasted a great deal of time in trying to solve some design issues that were already available “off-the-shelf” at his local bike shop, Woodrups of Leeds. Dennis advises that going to a small, specialist retailer was infinitely more valuable than the big chains, who are not always aware of what products are available. The shop's owner showed him several brackets and attachments that Dennis realised he could incorporate into the designs he had in mind, and also an existing LED light that Dennis felt could be modified to fit his device perfectly. Without telling Woodrups, or anyone else, exactly what he had in mind he bought up a load of lights, pumps & various brackets and set to work to produce a prototype which he called the Pumplight. He did not publicise the project because he was aware that 90% of patents become invalid because people have discussed them before application.

### **Intellectual Property (IP)**

After producing an initial working prototype, which outwardly looks almost identical to the final pre-production versions, Dennis felt it was time to re-visit the patent office and stake his claim on what he felt was a good idea with potential for producing a saleable product.

The first year of patent registration cost very little, this is the stage commonly known as patent pending. Dennis would advise anyone else starting down this track to seek advice from a patent agent, but with a note of caution. Agents can be expensive, and they can encourage you to invest in more, perhaps rightly so, than solely your original idea. For example, in Dennis' case, his agents advised him to register patents for two of his design

features that are integral to the overall Pumplight package. He has done so, but is unsure as to whether to take this up on expiry of the pending stage, which is when things get more serious. After a year pending, the patent holder can convert to a European patent which provides a further 18 months to develop the idea. After this the patent holder must make a decision as to what to do with their idea, as costs can increase dramatically. This can range from world-wide patents to local UK or Europe only protection, the more restricted, the less the cost. Dennis has opted for a worldwide patent on the Pumplight as he hopes that the idea will be popular in many other countries besides the UK.

What can or can not be protected? Something that is an obvious use of an idea is often referred to as being 'patently obvious', a legal phrase that has entered everyday speech. A successful patent must demonstrate something that is not patently obvious, and the Patent Office will categorise applications into three distinct groups: 'Prior Art', 'Relevant or Highly Relevant' and 'State of the Art'. A State of the Art classification is the most likely to gain full patent acceptance. Fortunately for Dennis, his application has been awarded State of the Art classification, so that his patent acceptance is assured.

The marketplace is another consideration when protecting an idea through patenting. How many of the products will the market demand, and will the income generated cover the considerable costs of maintaining the patent? Further I.P. protection can be acquired through patent insurance, which will help to contest any infringement in the most appropriate manner, including legal proceedings. Some might consider that patenting is not right for their idea and that a patent literally wouldn't be worth the paper it's printed on, in which case, the best protection might be to get the idea in the marketplace first and grab the lions share of the business.

## **Product Development**

Dennis' next move was to approach a large German pump manufacturer, as he had based his prototype on one of their pumps, to see if they were interested in handling the development into production stage, and perhaps also the marketing of the product. Disappointingly for Dennis, the company did not seem very enthusiastic about his idea. He feels that there were probably three main reasons for this. Firstly they did not appreciate and understand the products with respect to the intended environment. Cycling on the continent is viewed much differently to the UK, with more cycle lanes and other infrastructure to help cyclist and cars exist together. Bike racing is also a very popular sport in many countries such as Belgium, Holland, France, Italy and Spain. It often outranks football as the number one spectator sport, and consequently drivers tend to show more respect for those on two wheels. Secondly, although Dennis had a working prototype, the company seemed concerned that the product needed some development work before it was ready for manufacture. Finally, he felt that European manufacturers were struggling against worldwide competition, and therefore the development of new products was not on the company's agenda at that time.

This reaction was a disappointing but gave a good indication of the different geographical markets. However, Dennis decided to progress the idea and began to develop the product. He subcontracted Leeds Technical Design to produce 2-D technical drawings of the product. With those completed a chance conversation led him to contact a nearby university who were able to produce 3-D drawings and, using a technology called Selective Laser Sintering, manufacture 3-D parts directly from the drawings. This allowed him to make a second prototype from scratch to prove that the components would fit together and work properly. Finally, he approached a third organisation who had expertise in moulding and were able to manufacture a limited number of parts using temporary or 'soft' tooling at a cost that is much lower than using permanent or 'hard' tooling.

## **Market Research**

In parallel with the product development, Dennis felt it was important to find out what the market had to say about his prototype product, especially after the lukewarm reception he had received in Germany. He hired an independent market researcher who took the product into a typical bike shop and interviewed customers as they came in to look around. The results were promising, 60% of people who viewed the product said that they liked it and 40% said that they would probably buy one. There were also some other interesting and unexpected results. Many of those who said they would buy were partners or friends of cyclists who would buy one as a gift idea.

Once the prototypes were available, Dennis took the products to an outdoor pursuits exhibition, along with a poster, to demonstrate the idea and try to raise some interest. The day proved useful. A journalist from the trade magazine *Bicycle Business* liked what he saw and offered to run an article on the product in his magazine. He also met a representative of one of the UK's largest dealer of bicycle parts and accessories. They suggested he approach a Taiwanese manufacturer and they offered to make the appropriate introductions. It was also suggested that he approach venture capitalists for support.

## **What next?**

Now Dennis had some serious decisions to make. Should he approach venture capitalists? Or go it alone? Or book a flight to Taiwan?

What would you suggest is the best way forward?

## **Related Resources:**

**The Higher Education Academy Engineering Subject Centre teaching materials:**  
[www.engsc.ac.uk/er/entrepreneurship](http://www.engsc.ac.uk/er/entrepreneurship)

All the resources here are specifically enterprise and entrepreneurship teaching materials. You may find the following particularly useful in relation to this case study:

### **Teachers Notes B3 – Proven Idea – Ideas (in relation to market)**

#### **Session B3 - Feasibility Study**

This session explores the feasibility of idea in the market place – how can an idea be analysed to see if it is worth pursuing? A range of material is provided here to explore the customer perspective (marketing) and how an idea might be evaluated for customer interest, competition and potential to make an appropriate level of income.

### **Teachers Notes B4 - Proven Idea - Resources**

#### **Section B4 - Market Information**

Exploring sources of data for research, particularly for legal requirements (including intellectual property rights) is the focus. Information is provided on how to gain data and information required to develop the business planning process.

### **Teachers Notes B5 - Proven Ideas - Strategy**

#### **Section B5 - Strategy Development**

Taking a proven idea towards business start up requires an appreciation of the customer. These slides help identify customer types and profile them using market segmentation techniques to determine if there are enough potential customers in the area.

### **Teachers Notes B6**

#### **Proven Idea – Planning and Operations (tools)**

#### **Section B6 - Techniques**

Techniques for proving ideas are drawn from market research and analysis of the new product development process. This session explores how information promotes effective decision making to ensure the development of sustainable new businesses.

### **Teachers Notes C3**

#### **Planning and Development – Ideas (in relation to market)**

#### **Section C3 - Market Analysis**

This session introduces analytical tools which explore the market and help determine appropriate strategies. The business planning process demands that ideas are developed against the market realities of customer and market trends, competitors and internal resources and strengths.

## **Teachers Notes C6**

### **Planning and Development - Planning & Operations**

#### **Session C6 - Business Plan**

The research and analysis required for drafting a business plan has been built up through out the previous sections, so this session focuses upon writing the business plan. It contains an active business plan template as well as teaching support for the plan and its elements (finance and accounting). There is also a marking scheme for using the business plan, or its component parts, as an assessment.

## **Teachers notes D6**

### **Ready to start up – Planning and operations (tools)**

#### **Session D6 - Practicalities**

This session looks at the requirements of set up. Slides are provided on sources of finance and a handout regarding practical issues is included. However please ensure that this is updated regularly.