

# **The Engineering World At Your Fingertips**

## ***A Rough Guide To Making a Career in the Profession***

The aim of this guide is to give younger people entering the engineering profession some forewarning of just what they may be letting themselves in for.

It is designed to help the reader appreciate what options are on offer in the world of the working professional engineer, some of the good and bad points of different career options, and how to make the most of the opportunities which appear. It also indicates those areas where the support of a Trade Union can help to 'level the playing field' in the face of the power of employers and other institutions.

It does not cover all eventualities, but is intended to provide basic information on the main aspects. It aims to be short enough to be read as a whole to get a balanced view of the total scene, but is subdivided so that the reader can dip into specific topics as and when the need arises.

## **A Rough Guide To Engineering**

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# **A Rough Guide To Engineering**

## **1. Is There Life After University ?**

Most people enter the engineering profession after education at school and university. By then, many feel that they have already experienced a hard and highly competitive world. Not a bit of it - to quote one American President: “you ain’t seen nothing yet”.

The world out there in industry and business is a whole different ball game. The options, the possibilities, the politics, the pressures, the personalities, the procedures, the beancounters, the deadlines, the competition, the deviousness ..... the list goes on and on.

The aim of this booklet is to give younger people entering the engineering profession some forewarning of just what they may be letting themselves in for, and to help prepare for what their future will throw at them.

It is designed to help the reader appreciate what options are on offer in the world of the working professional engineer, some of the good and bad points of different career options, and how to make the most of the opportunities which appear.

The good news is that there are rewarding careers with interesting work. Many engineers have been successful in their chosen career path and have enjoyed most, if not all, of their work as professional engineers. For the very fortunate few, there are also the glittering prizes of top management and academic excellence to aim for.

There are plenty of career options if you stay within engineering, and many of them use very different skills from those taught at university. Learning to work as a team member, rather than an individual, often proves to be a critical success factor.

These initial observations could be interpreted to suggest that the only real engineers are those in business and industry, and that academics don't count. As young engineers have already seen academia from the inside, it is not the prime focus of interest here. But don't worry, the academics have not escaped and there is a section for their part in engineering as well.

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## **2. Is Engineering For You ?**

The first and most basic question is whether to work in engineering at all, and the answer depends to a large extent on the chosen definition of engineering. There are many interpretations, all slightly different.

Engineering is defined here as any activity which involves engineering in industry; with the purpose of generating products and services which society finds useful and is prepared to pay for. Therefore it includes line management, project management, marketing and contracting, as well as the more predictable research, design, development and manufacturing activities. It also includes the academic (university etc.) research, which goes on in support of future products. So there are plenty of options if you stay within engineering and for many of them you don't spend much time using the things you were taught at university.

The first thing to notice is that the culture in engineering, like any other business, is different from being a student. As a student you were an individual doing things to get yourself through the degree qualification process; other students were not normally part of your studies.

In engineering you will nearly always be part of a team and have to learn to be an effective team member playing for the success of the whole team (as well as for yourself). There will be cultural characteristics and procedures peculiar to your employer as well as the need for acceptable discipline and timekeeping.

Engineering is a business, it's there to make money, profits: just like any other commercial activity. There is plenty of scope for having some technical fun, but the whole activity has to make a profit today otherwise there is no opportunity for having more fun tomorrow. Engineering needs all the normal business functions to make it work as a business and it is usually possible to move into a different area within your existing employer. This enables you to get wider experience and helps your progress if and when you move to another employer.

What else can you do? While an engineering degree, like any other degree, demonstrates that you possess some combination of intelligence and application, it does not give you the basic knowledge for everything. However, assuming you have not decided on a total change of direction, there are many alternatives.

Most of them can be achieved by staying within engineering and it is very often possible to move within your current employer. The advantage here for the company is that you already know something about the business. But there are many other activities where the basic training of an engineering degree will give you a useful start. For example, there are many parts of the civil service, local and national government and the city where direct entry from university is possible, and a much wider field opens up once you have some real experience outside university.

However the prime purpose of this booklet is to cover the world of engineering; it is a big enough field in its own right.

### **3. What Can You Do in Engineering ?**

“Engineering” covers all the activities associated with designing and producing an engineering product and gives a very wide range of options. So if you really did study engineering because you enjoyed it,

you should be able to find an interesting and challenging career within the industry.

The first part of getting employment in engineering is going through the recruitment process. This is mostly hassle-free and discrimination on any unreasonable grounds (race, ethnic origin, sex etc.) is illegal and very rare today. However age discrimination is still out there; and at both ends of the age range. Trade unions have the knowledge and experience to help anyone who is discriminated against; either during initial recruitment or later during their career development. Modern recruitment practices try to use as much science (or pseudo-science) as they can - a whole battery of psychometric and other tests are used to generate data for assessment. This analysis sometimes seems to be regarded as more important than an interview, but if you want the job, you have to play the game.

New graduates usually start doing technical engineering jobs in research, design, development, manufacturing, assembly or service support. This is where they start to learn what the business world is like and how to run a business, and some of the weaknesses and shortcomings of the real world.

It's easy to see how an organisation can become a loosely connected group of competing compartments. The designers draw up what they think the market wants and toss it over the wall to manufacturing, who aren't quite sure about some of the features, but think they can make something which will do what the designers intended. They toss it over the wall to marketing, who get a random number from commercial, which they use as the price, and toss the product out into the marketplace. Service support spend their time placating irate customers and complaining that the design was totally wrong in the first place, forgetting that what was actually produced was probably quite different from the original design, or from the market analysis (if any was ever done). Sadly, such implausible disasters happen all too easily and all too frequently.

Probably the most fundamental lesson for the new entrant is to learn the estate agents' dictum about the three most important factors: but instead of location, think communication, communication, communication. This need for communication is partly why industry puts pressure on universities to produce graduates who have a good understanding and use of English. The benefit for the individual from this need to communicate is that there will be plenty of opportunity to see how the other parts of the enterprise work, which will help you find the job you really want to do. The opportunity will be there but you do have to take it; it will not always be thrust upon you.

Engineering is a business and must get certain fundamentals right. Basically, it must get the cost, the price and the value of the products and services it offers in the right order. The cost must be less than the selling price, or else there is no profit in the activity; and the selling price must be less than the customer's perceived value, or else there are no sales. The professional engineer's primary function can be simplified into creating the largest possible gap between the cost and the value. Then the selling price can be adjusted to provide the combination of sales volume and profit margin which suits the business while remaining competitive. However, it is also necessary to ensure that the product or service can be delivered with a consistent level of quality and will be 'safe' for the customer. This has the potential to bring the engineer into conflict with their employer, who may want to cut more corners than the engineer believes to be right. This is one of the areas where support from an appropriate trade union can be very useful, because the employer has much more wealth, power and influence than the individual engineer.

For this 'cost, price, value' equation to work, the various parts of the business must understand each other, although often it is as if these groups speak different languages (some of them really do, commercial and marketing in particular). Perhaps one of the responsibilities of the professional engineer is to make sure that the commercial and marketing colleagues understand enough of the engineering to make proper judgments in their own field.

Part of the job of an engineer is to provide support to marketing and to partner companies, in discussions with customers and with suppliers. This is a fruitful route to move into other aspects of the engineering business and has allowed people who qualified as professional engineers to move into marketing, commercial and customer relations roles.

Current perceived wisdom is to create multi-disciplined teams for each significant project. This is fine to improve the internal project communication but can result in fragmentation of all the individual areas of expertise. There are now roles where the responsibility is to collate the professional aspects of the job and ensure that they are used effectively in all aspects of the business. This is part of a much wider field of 'knowledge management', which tries to capture best practice and to distribute it around the business.

If you want to continue as a practising engineer, you will need to maintain your 'Professionalism'. You can never have too much training. The engineering institutions are all concerned that their members maintain competence by being involved in some form of documented 'Continuing Professional Development' (CPD). Sooner or later, someone will be struck off for not having the right ticks in the right CPD boxes. Don't let it happen to you !

#### **4. The International Dimension**

*"Be an engineer and see the world .... " ?*

All major industries are benefiting from (suffering from ?) globalisation. One result of this for professional engineers is that more and more they work with a range of international contacts and need to travel around the world. There are opportunities for foreign travel in most businesses both short term and long; sometimes with very little notice.

Almost everyone can recount a tale of being sent home from work to pack a suitcase and catch the afternoon flight to wherever because of

some crisis. Telephone, fax and e-mail all help to reduce the need for travel but there is no substitute for face-to-face meeting at the start of any relationship.

Even without travelling, we still need to cope with the cultural and language differences. In some industries, such as aerospace, and oil & gas, English (or more frequently, American) is the international language; but even here some knowledge of other languages is useful, if only to help you get what you really want in restaurants. Wherever you work, it is a fundamental courtesy to learn the very basics: good morning/day/evening, goodbye, please, thank you, excuse me, etc., because it helps to show that you are making an effort to communicate on their terms.

So if you like languages or are good at them, learn all you want, they will probably help. But with English as your first language you should select carefully, because some of the obvious ones may not help your actual career path as it works out in practice.

All this international activity gives professional engineers plenty of opportunities for foreign travel at their employer's expense. But, naturally, employers want to make sure they are getting value for money. In the 60' and 70's many employers arranged their employees' travel for them and either had their own 'travel offices' or travel managers who made arrangements with tame travel agents.

Nowadays the general attitude is that foreign travel is so common that people are expected to make their own arrangements, often via an approved travel agent who knows the company rules and makes sure you don't break them. The basic rule is to find out what the rules are, so you know what you can and cannot do. Generally, if you behave reasonably, you can get forgiveness for minor rule breaking - but you would never get advance permission for the same thing. Normally foreign travel plans work pretty much as intended but there are always exceptions – check your insurance before you go !

## 5. Women in Engineering

Engineering has traditionally been perceived as a “man thing” – “boys playing with their toys”. Well, that is the image presented by the media. But the law requires and expects equal opportunities. So do women get on in the world of engineering ?

The answer is generally “yes indeed” ! If you are a feisty dynamic person then you will love it. Most men enjoy female presence in the workplace. No-one expects you to make the tea any more, but if they ask you to take notes at a meeting it is because you are at least twice as quick as anyone else –so don’t get a secretary complex! If you are good at your job you will probably get more attention and promoted faster than your male counterpart. If you are a rigid 9-5 person, perhaps for family reasons, then promotion will be limited. This would apply equally to men and women. But there are nearly always positions available in engineering which require a steady reliable person rather than a dynamic ship-jumper type. All professional engineering organisations are totally committed to equal opportunities and may even preferentially promote women to show this commitment to equality.

So you get your first promotion. Most men respond well to good bosses whether male or female – a few men will dislike whatever boss. All men are bossed by their mothers and wives/girlfriends, and are susceptible to a little female flattery, but if they don’t respond well to a female boss then it may be that she is just not a good boss. Dress smartly, be yourself and do not try to copy the men – they don’t necessarily have the right answers; and at senior level there is often too much ‘dog eat dog’ going on. Setting your boundaries for acceptable behaviour and how you are best able to do your job is important for everyone but particularly so for the female minority in engineering.

There is still a glass ceiling for women on the promotion ladder – this is not a direct sexist issue as the senior positions require such time and travel commitment that many women find it difficult to

meet these demands when they have a family. In the hard world of commerce it is difficult to always adopt family friendly hours, as the Houses of Parliament have tried to do since 2002. However there has been a dramatic sea change of attitude in recent years to maternity leave, home working and part timers. Many engineering companies are quite flexible – but clearly you can't expect to come home for tea every day if you work on an oil rig, or to arrive at 10 a.m. when the production line starts at 8 a.m. prompt. So be realistic when interviewing for a job, to make sure that the demands of the job are compatible with your lifestyle.

One of the biggest questions is “when should I start a family ?” Unfortunately it is difficult to match the physiological and socio-economic aspects precisely. Medical opinion favours having children early, whilst socio-economic influences favour having children later. In this difficult area, the simplest advice is to have children as soon as you are ready and not to delay for a potential career prospect. Career prospects will nearly always turn up again but children may not. Many very successful career women have had children, so having children must rate quite highly as a developmental and managerial experience !

## **6. Some Engineering Dilemmas:**

### **6.1 ‘Engineer’ and ‘Manager’ – Are They Mutually Exclusive ?**

Can you be both ? Most graduates coming into engineering start off carrying out a technical job. It is unusual to go straight into a job with responsibility for getting work done by other people. Of course, this does not mean that you never have to get co-operation from other people in your department or in different parts of the business. Influencing others and getting them on your side is all part of the game. The top job on the top project at any time never has any difficulty in getting priority through the official system, but any other project depends on the ‘black priority system’ (a bit like the black market) to keep ordinary jobs moving.

This process depends on knowing the right people and being able to influence them. These days, it's not just 'what you know' or 'who you know' but also 'what you've got on who you know'. Not that blackmail is a job requirement ! Most of the time, if you describe what you are trying to achieve, how important their contribution is, and ask for their assistance, most people are very willing to do what you want and very often suggest a better way of achieving the result.

There are very few jobs within the engineering community where you can instruct people what to do and expect them to just do it. You need to be either very very senior, or dealing with the gophers. Basically every professional engineer is a manager in the sense of an influencer of others. Even lone researchers have to persuade someone to fund their activities.

What does this mean for career progression ? Generally 'promotion' in the sense of moving to a role which increases pay, means taking more responsibility. The only way to be responsible for more than we can do as individuals is to be responsible for the work done by other people. Hence promotion nearly always means less technical engineering and more planning, organising others, etc. But this is still an essential part of the engineering business. This suggests that the only way to remain a 'technical engineer' in many organisations is to resist promotion (and maybe stay poor) or go back to academia. However, industry is recognising the problem and companies are beginning to create promotion structures for technical specialists. This is a step forward but progress is undeniably limited.

So are all engineers also managers ? Possibly not - perhaps the essential function of a 'manager' is responsibility for getting work done by other people (Project Manager), or for the quality of the work of others (Line Manager). Thus the answer to the original question is 'sort of' - rather unhelpful.

## 6.2 Generalist or Specialist ?

A classic often-quoted distinction between generalists and specialists is that the former learn less and less about more and more until they know nothing about everything; and the latter learn more and more about less and less until they know everything about nothing.

However, like all such comments, this over-simplifies things just a little. In reality things are never so clear cut. The generalist has to be able to understand the specialist details when necessary in enough depth to assess the impact on the overall situation. Equally the specialist has to understand enough of the overall picture to know how to apply his or her specialist knowledge and communicate with the project management. There are very few total specialists or total generalists, although most people have a clear tendency one way or the other.

One difference in the modus operandi for the two types is that generalists normally have a number of 'problems' on the go at any one time. On the other hand, specialists usually like to concentrate on one job (or group of related jobs) at a time and work it through systematically over a period of days, weeks or even years.

For any individual the decision on which way to go is a question of personal preference based on the way they prefer to work and where they hope their career will take them. The main disadvantage for the specialist is that the normal promotion routes into project or line management favour the generalist. Also the majority of more senior jobs require a broader and, inevitably, shallower approach to things, i.e. they are basically 'generalist' jobs.

This 'problem' has been recognised for a long time but the response has been patchy. However, things are getting better for those who want to stay primarily as relatively specialist engineers and there are promotion routes in some large companies which recognise the contribution that such people make. This is generally in roles associated with improving technical methods and practice, and spreading these techniques across the business.

### **6.3 Staff or Contract ? – An Enduring Conundrum**

In manufacturing, permanent employment for professional engineers in large numbers is probably only a phenomenon of the time since the industrial revolution. From then onwards, the expertise of the professional engineer was seen as a valuable commodity, usually the result of considerable investment by the employer in terms of apprenticeships, education and training (hence occupational pensions). Also many employers believed that they needed people trained in their ways of doing things. Therefore employers were looking for loyal workers, who would dedicate themselves to doing whatever, and however much, work the company wanted (not much change there then).

However, the civil engineering world always had a significant amount of consulting / sub-contract employment, because the products were usually too big to make in a factory, so both factory and workforce had to go to the product.

In our own time, professionally contracted engineering services are to be found to some extent in all engineering industries, particularly in the IT and oil & gas sectors.

Projects have got bigger and fewer, the peaks and troughs of workload in many companies have become more dramatic and making people redundant has become more expensive - hence the attraction of sub-contractors, who can be turned on and off almost instantly.

So how does this 'sub-contract' system work ? For most people the first step is to register with an agency, which provides the link with businesses who need contract engineers. As far as the individual is concerned, the agency is the employer for the duration of the contract.

The sub-contract route may be less effective in the early stages of your career. Generally it is more difficult to become a qualified professional engineer, because you do not have the continuity of employment, which gives you the necessary training content and the contacts who will sponsor you.

Contractors get paid a higher hourly rate if they are effectively self-employed, to cover their other costs. There may also be a professional risk aspect. Some people like the variety and the ability to change tasks frequently, the experience of working in different industries, different companies and different countries. The disadvantage is the insecurity of any one contract.

So which should you choose ? It's largely a matter of personal preference and your desired balance between freedom, variety and security. In both cases there are various legal frameworks, intended to prevent employers behaving like Genghis Khan, though they tend to be complicated, and trade unions are the best source of expert advice.

## **7. Management – A Myriad of Meanings**

Management of projects and people are both integral parts of engineering – three categories are described here:

*technical engineering* includes the understanding of materials and processes.

*project management* involves the planning control and use of resources, including people and equipment.

*line management* covers the selection, recruitment and deployment of people.

Newly qualified graduates normally start as 'Technical Engineers', applying university education while learning about the business. This work is the coalface of engineering, where the details of the products, services and methods are defined. The people at the top think that they control everything. They don't, they only control what they know about. If you can make everything run smoothly at

the coalface, then the top neddies will never trouble you (well hardly ever). They will want progress reports to help them feel comfortable and important, but as long as you can give them the sort of messages they want to hear, they'll be happy, and you will be in control.

You can keep this up until something happens that you were not ready for, or you need their support against another top neddy. Then you do need the 'man management' skills, or perhaps 'manager management' skills, that are normally associated with the more senior jobs. Although most large organisations operate this way for their own survival, there are always pockets where personal protection and advancement takes over, dross dominates and common sense goes out the window.

The 'Project Manager' role is usually dominated by milestones, resources and costs. However, many project manager jobs involve a large amount of technical decision taking. This is often directed at achieving the milestones etc. in the face of unexpected results or events. Because the project work is usually being performed by a large group of people the project manager has to depend on their input to make project decisions. This often involves teasing out the nuggets of information you need, a bit like a detective.

The 'Line Manager' role is the traditional 'boss' - the person who does the hiring and firing. However, even this 'boss' is constrained, e.g. by high-level policy, budgets, headcount limits, human resources procedures, etc. This role has the least technical engineering in it and is usually dominated by the numbers and quality of people involved and the processes they work to.

Do we have the right type and quantity of people / work stations / computers / software packages ? Does anyone know what we are really supposed to be doing ? It's easy to get bogged down in the detail and lose sight of the real objective. When you are up to your neck in alligators, it's sometimes difficult to remember that your original objective was to drain the swamp.

But then, on the other hand, the devil is in the detail; so just keep shooting the alligators.

## **8. So You Want To Be A Star ?**

The first question to decide is whether you want to be a rising star at all. High fliers attract high levels of aggravation and stress: do you want to be that wedded to the job ? Are you someone who lives to work or who works to live ? It may seem very glamorous being rung up in the middle of the night to help solve some crisis - but it does get in the way of any life you may want to have outside work.

There are those who have a clear idea of the level of job which they want to achieve in their career (although when they start out they can have no real idea what that job involves). There are others who take life as it comes and accept promotions as and when the opportunity offers but do not actively pursue greatness. It all depends on your own preferences and attitude to life.

However, if you want to try for glory there are several things to think about. The first essentials are basic education and skills, and the willingness to make some effort, even if it is only directed at getting promoted.

### **8.1 Rules of Engagement**

A few philosophical comments on the promotion game to set the scene. People tend to get promoted because they are doing their current job well. This does not mean that they will do the new job as well as the old, or even that they will be able to make an acceptable stab at it. As a result, a significant number of promotions are failures because the individual has been promoted to the point where they are just incompetent. Sometimes the problem is not the level of the job but the content. For example someone may fail in a line management job but be very effective in a project management job at the same level.

Think of the hierarchy of a company like a tree full of monkeys. The top apes look down and see nothing but smiling faces. The workers below look up and see a load of a\*\*\*\*\*s. Individuals can decide for themselves whether this fits in with their own experience of the companies where they have worked. Many of us do appear differently to our bosses than we do to our subordinates, and in some cases the difference is enormous.

They say that those who are really good naturally rise to the top, like the cream (or the scum !). All very well but you need to be in the right place at the right time, as well as being good; and are you prepared to wait? How do you improve your chances?

## **8.2 Some Strategies for ‘Rising Stars’**

### *‘Being Brilliant’*

One approach is to work on the principle of aiming to do your current job superbly well, so that you help your immediate bosses and are seen as totally dedicated and reliable. This seems to work, as there are examples of engineers becoming directors of an engineering function with over 2000 people by the time they are 40; but it does not work for everyone.

Think who has the most influence on your future prospects, after yourself that is ?

Perhaps not your immediate superior, but the next level up.

Remember that your next promotion will put you on the same level as your current boss and turn you into a potential competitor.

Therefore, while you should try not to fall out with your immediate boss, the important person to influence is your boss’s boss.

### *'Acting Up'*

One individual who was a very successful rising star used a very simple technique. As soon as he got promoted he started doing his boss's job wherever possible. This made him very visible to the next level up and showed them that he could do that job. Of course the time taken by all this meant that he couldn't do his own job properly; but as long as he got the next move soon enough, he escaped before the s\*\*t hit the fan and it was always 'someone else's problem'.

### *'Hanging on to the Boss's Coat Tails'*

The time to keep in with your immediate boss is when he or she is clearly a high flier. In this case one option is to latch on and convince the boss that you could fit nicely into their shoes when the boss is next promoted. In this way you rise up together, but there are dangers in this technique. You may get left behind if your 'mentor' has more potential than you, and your 'mentor' may well lose interest in helping or protecting you when you can no longer help them up the tree.

You may have taken a post, which you didn't particularly want (or are not good at) to help the boss make another step, and then get left 'exposed'. You may find that the boss actually has less potential than you and may become a block to your progress. The worst scenario is where the boss falls out of favour with the organisation and you are seen as one of the protégés and treated accordingly, even resulting in redundancy. So you need to be alert to the possible need to 'unlatch' yourself from your mentor, to avoid getting left in the lurch.

## **9. Fancy Being a 'Consultant' or 'Self-Employed' ?**

### **9.1 First Steps to A Fortune ?**

An independent consultant can become either self-employed or a director of a limited company. It is usual to set up as a limited

company, and many larger organisations insist on it as a condition of contract. Many potential client companies require independent consultants to join with larger groups as an associate. This does not create many problems and some such intermediate companies can be very helpful in getting more work.

Setting up a limited company is quite easy and fairly cheap, perhaps £200 to set up and a minimum of about £400 per year to run. But the associated paperwork, annual accounts, company returns as well as Inland Revenue P60's etc., must be produced by law for each company. If your annual turnover is less than £50,000 per year there is no need to register for VAT.

## **9.2 What Daily Rate To Charge ?**

A good starting point is to take the annual salary that you would get if you were a full time employee and divide by 150 - use the answer as the daily rate. This starting point is obtained by taking about 200 working days per year, after allowing for personal holidays, public holidays and minor illnesses. Add into account pension contributions and national insurance (approximately 20% of salary), plus an allowance for training courses, human resources and administration plus paid waiting time, i.e. a further 5-10%. Thus subtracting this 25-30% from the 200 working days, the average employee is equivalent to about 150 days of independent consultants time. You may be able to adjust this up or down, depending upon whether some of this work can be done at home or requires travel, and who pays for travel expenses and travel time.

Finally, you must know when you are going to be paid – some contracts state 60 days from the last day of the month in which satisfactory completion is obtained. This means 3 months after you have totally finished - not acceptable if the company has a reputation for nit picking. Intermediate milestone or standard monthly payments should be agreed. If there is a risk of delayed payment or incurring unexpected expenses then say so and increase your daily rate accordingly.

If you earn money as a director of a limited company, then it belongs to the company and not to you, until the company pays it to you. At that point income tax is due.

### **9.3 What Are The Major Pitfalls ?**

Firstly, you will need public liability insurance which may be as low as £100 per year if you have a desk job, to perhaps £2000-3000 per year if you undertake more dangerous activities such as welding etc. This insurance is normally a condition of employment as an independent consultant.

Secondly, you will need health insurance.

Thirdly, the terms and conditions of your contract must be examined. On no account accept product or project liability as your employer could sue you for failing to meet a target in terms of performance or time – for reasons that are outside your control.

Finally, the major pitfall is that the ability to control your own workload is now taken out of your hands. One minute you may have too much work, the next minute too little. When you were a paid employee this was your bosses' problem to prioritise: now you are the boss !

### **9.4 Does IR35 Crush Consultants ?**

It is really intended to stop people leaving a job one minute and then being re-employed as a full time employee under different rules. If you are a genuine independent consultant, there should be few problems.

### **9.4 Want To Be Your Own Boss ?**

If you become self-employed, you have to be researcher, engineer, project manager, human resources manager, marketer and businessman/woman all in one. All the other sections of the guide are relevant in this case, because you will be doing everything yourself.

Another area in which you will need plenty of advice is on setting up your own business, which is a subject for another completely separate guide.

## **10. Attracted To Ivory Towers ?**

### **10.1 What's Different About Academia ?**

University effort is usually some way from the coalface where the work actually changes the way we live and society operates. It is also less 'contaminated' by the need to concentrate on work which will turn a profit, and to do so in a short time.

Industry wants others (e.g. government agencies) to contribute to the research it needs, and academia wants to be able to claim that it is doing work useful to industry and business. There is a fundamental difference between academia and industry, which can be a cause of conflict. Academics always want to publish as soon as possible to beat the other academics, while their industrial supporters don't want to publish until the results are patented or have been exploited commercially.

Like many of the other different options described in this booklet it all comes down to personal preference and general attitude to life. What is certain is that society needs variety, otherwise only one type of job would get done.

### **10.2 Does Promotion for Academics Stop Them Doing Engineering ?**

Yes ! (just as it does in industry). Professors and Deans usually do a lot of admin and are responsible for planning the work of the dept / area, recruiting staff, getting both funding and work from outside, as well as lecturing and perhaps doing a bit of research. Few top academics have time to do much research, they usually only get as far as deciding on the fields they want their University to specialise in, and reviewing the papers to decide who gets the top prizes.

### **10.3 What About Switching Between Industry and Academic Worlds ?**

Few people ever move between industry and academia, and very few do so more than once. Because of the increasing contact between universities and industry, this type of move is becoming easier. If you really want to make the move either way, you should be able to work it.

### **11. Getting Chartered**

Engineering, like most other professions, has its ‘learned societies’ (Institutions) which campaign in support of the profession and regulate the standards of the individual members of the profession (see list in Appendix). Originally most engineers in the UK worked for the armed forces. The increasing number of engineers working on non-military activities formed a separate group of Civil Engineers (as distinct from Military Engineers). As the industrial revolution developed further separate groups appeared starting with the Mechanical Engineers. These societies have membership grades which suit engineers at all stages of their careers from the undergraduate onwards. Membership at the ‘Corporate’ levels provides an acknowledgement, recognised worldwide, that you have reached a full level of competence; and this is sometimes very useful when changing jobs. However all this comes at a the price of a significant annual subscription and none of the Institutions is a model of democracy; some would say the establishment has too much influence. There have been proposals for statutory registration for years (like doctors and lawyers) as a means of raising the profile, value and standards of Engineering. But the establishment forces have prevented any radical changes.

### **12. Live for Today, or Save for Tomorrow ? - The Great Pensions Puzzle**

To most newly qualified people, a pension is way over the horizon, it’s something which only affects ‘old people’. Typical attitudes can be summarised by “things may change totally before I retire; I might not live to get the benefit”. Although we cannot predict the future, equally

we can't go back and change the past when the future turns out to be different to what we expected.

However, the thinking has changed significantly in recent years, because of more job changing, portable pensions, the under funding of company pension schemes and companies threatening to withdraw from them, or otherwise reduce their exposure. One of the positive consequences is that pensions have a much higher profile and the subject reaches the consciousness of more young graduates. Being aware of the question is one thing but there is no clear answer as to what an individual should do and there are many people who claim to be 'expert advisors'. The advice offered is not clear and not always consistent. The upshot of all this is that everyone needs to make some provision for their retirement, and there is a consensus that the earlier they start the better, and easier, it is.

Changing jobs has been a routine feature of being a professional engineer for many years. If you change jobs it plays havoc with any pension you might receive from an occupational pension scheme. A couple of job changes in your working life can easily halve the pension you might receive. The introduction of 'transfer values' and then 'portable pensions' has improved things somewhat, but employees who stay in one final salary pension fund for the last 30 years (or more) of their career get a pension which is hard to beat. The best option for the employee is still an employer with a final salary scheme where the benefits are defined as a proportion of salary.

What does this mean for career choices? Does it mean that you shouldn't change employers? No, but you do need to be aware of the possible effects and do something about it now. The main message is that it is much more difficult to correct if you leave it too late.

It is also worth considering that a typical final salary scheme puts between 15% and 20% of the salary bill into the scheme (when you add up the employer and employee contributions). Thus to get an acceptable pension of around 2/3 salary from any alternative system, you need to put away close to 20% of your salary.

Being self-employed is another option which affects the way your pension will be generated. It virtually forces you down the portable pension route, with its dependence on the annuity rates in force when you want to retire.

### **13.And Finally ...**

The engineering business requires a wide variety of skills and characteristics to make it function. Most people can find a home somewhere in it, where they are comfortable with their role and with their neighbours. Employers, however, no matter how well meaning, seem capable of making decisions about their employees which are stupid beyond belief. The individual has little ability to make them see the error of their ways and that is the reason for trade unions in the profession - to counteract the power of employers. But ultimately, we are all in it for profit, not for conflict - and usually a good case will win the day - particularly if you can convince the other side they thought of it in the first place !

**..... Go Forth and Engineer – Have Fun !**