

Small & Micro Hydropower

How we arrived at present situation

I understand that in recent years Keith Wheaton Green has worked from Somerset County Council offices promoting hydropower. A few years ago a one day meeting was held at Brian Shingler's mill, Somerset, where around 50 mill owners attended. More recently Somerset County Council sponsored a one day event, 26th March 2008, at Taunton County Cricket ground - more than 100 attended. Suppliers of hydropower equipment were asked to attend, at their own expense.

Anthony Battersby, Brian Shingler, Keith Wheaton Green were among a few who were complaining about a lack of professional standards within the industry. They did not know who to believe because they received differing proposals from different consultants and engineers. They are apparently looking for some acknowledged standard whereby these professionals can be judged.

On August 20th 2008 Peter Austin of Wallbridge Mill, Frome asked me to comment about the issues that the Mendip Mills Group are concerned about. I said that I would try and help and these notes are my thoughts, even though some may find them offensive.

The Mendip Mills Group in my opinion are complaining about their own shortcomings. The majority in my experience live in/own very valuable properties, probably worth in excess of £750,000, but usually only have a superficial knowledge about waterpower. Few if any belong to the BHA or ESHA (European Small Hydro Association), neither do they subscribe to the various technical magazines available:

Water Power & Dam Construction
Hydro Review Worldwide
Hydropower & Dams
European Small Hydro Association
British Hydropower Association

Or more diverse magazines,
Sun & Wind Energy (German published in English)
Your Environment

There are also available a long list of other publications,
some from years gone by, which could help inform them.

The Fundamental Principles of Water Power Engineering
(1920 – 50) Pitman
Industrial Archaeology of Watermills & Waterpower
Windmills & Watermills
The Watermills of Britain
Hydraulics and its Applications
Applied Mechanics and Mechanical Engineering (1936)
Power of Water (1879)
and many more

If millowners do not know what is required (and what they
should be looking for) and are unwilling to go to the
trouble to find out, their only alternative is to commission
the professional advice required.

Anthony Battersby of Tellisford Mill, chairman of the
Mendip Mills Group, has made it quite plain to me that he
is not prepared to spend money on a subscription for an
association, neither does Anthony wish to run a magazine
for waterpower – millowners. The impression is that they
want ‘something for nothing’.

All the foregoing leads me to quote the following Arab
proverb:

Men are Four

He who knows not, and knows not he knows not,
He is a fool, shun him.

He who knows not, and knows he knows not,
He is simple, teach him.

He who knows, and knows not he knows,
He is asleep, wake him.

He who knows, and knows he knows,
He is wise, follow him.

This leads me on to Prof Emil Mosonyi, who was quoted in the ESHA magazine (1994) as follows,

"The implementation of small hydropower plants cannot endure the luxury involvement of several experts ... it needs engineers having broad knowledge of diverse fields of technology and environmental issues."

Looking at our potential industry and the mistakes made by those who complain about hydro specialists I make the following comments:

"a little knowledge is a dangerous thing".

"you get what you pay for".

"pay peanuts and you get monkeys".

"free advice is cheap advice".

"the blind leading the blind".

"when ignorance is bliss it is folly to be wise". (Seems to fit most of the unsatisfactory experiences being complained of).

Potential developers who are unwilling to look for good advice from experienced practitioners, are the real cause of their own problems. In the Mendip Mills Power Group, well intentioned members have been making the most complaints, but empty vessels make the most noise.

At the other end of the spectrum, some people put much faith in employing those with a grand title, ie Doctors & Professors, or those with a chartered professional status, but so often in the case of small hydro actually, without the relevant practical expertise.

If you employ major civil engineering consultants for your hydropower scheme it is unlikely that you will get relevant long term experience here. The job will be 'too small' in financial terms to justify the time of a senior engineer. It is more likely to be allocated to a newly qualified graduate

with very little knowledge and experience (which he will gain at your expense).

Consultants and their Personalities

Millowners seem easily confused about what they are looking for, they often will like those who will tell them what they are hoping to hear, and often will dislike those with a more honest view. Ability, frankness, knowledge and experience are qualities that are sometimes lost because of what is seen as disagreeableness or unpleasantness, when in reality is simply good advice, which they cannot accept.

Hence, someone like myself (Ossie Goring) can often be dismissed because my virtues are misunderstood. The potential customer becomes confused in what they are looking for and goes for assistance/advice from someone with lesser ability but more congenial manner - big mistake if you are spending £100k's.

The customer needs to recognise what they are trying to achieve. Often they start off with one or other of the following observations:

"I am interested in a hydropower installation".

"I would like a simple low cost project".

"I would like to sell the electricity to make money".

"I would like enough electricity to run my house".

"I would like to retain the existing structures and water wheel".

"I would like to retain the existing aesthetics of the mill site".

"Can I get a grant"?

Rarely do potential mill operators even understand enough to mention the aspects they should be considering, "quality, low maintenance, trouble free operation, professional implementation", so often they are

most interested in “cheaper, smaller, simpler, and the something for nothing approach”.

The potential customer should appreciate that for every 1000 enquiries only one or two will ever come to fruition. Hence those of us “who know” become sceptical, irritated and disillusioned. Why should we suffer fools gladly?

My knowledge and ability with hydropower has not enabled me to earn a living from it, fortunately I earn my living from other engineering interests and business. But millowners and the wider potential beneficiaries from hydro can be assured that I have also spent much time and effort attempting to lift the bureaucratic and regulatory obstacles that are also preventing progress.

There are in reality a succession of interlinked problems that relate to the ‘the lost art of hydropower in the UK’. These broadly are :

1. A society that lost interest in small scale renewable energy (but is now waking up again to this).
2. A regulatory context that does not allow for small scale renewables, especially hydro.
3. A lack of understanding by property owners (potential mill operators) as a consequence of 1 & 2 above.

Construction – Liability – On Site Responsibility

A well planned and well constructed project starts to repay and earn money from day one of operation. A poorly planned and implemented project is an ongoing liability and difficult to put right. If you have spent £100k's on a bad project it is unlikely that you will take it out and start again.

Insurance companies are not very willing to take on river engineering risks. If they do, the premiums are extremely high – prohibitively so. How do you insure against flash floods and the resulting damage during the construction of a project. Experience can moderate the risk.

There are many examples in recent years of projects undertaken by newly established renewable energy professionals that have come to grief. eg Turbines installed incorrectly in sluiceways that were there originally for good reason. Low cost solutions to pipelines and forebays insecurely anchored – with catastrophic consequences at times of flood. Even larger scale projects, (Beeston Weir), undertaken by major civil engineers, with resulting operating levels 600mm lower than originally, leaving boats stranded and fisherman angry, enabling the EA to highlight the shortcomings of hydropower from such examples.

How does the Customer Choose?

Buying a new car is straightforward. If you do not like what you have bought, you trade it in and lose a few £1000s.

If you build a house and don't like what you have built you sell it and buy another.

IF you construct a turbine installation badly you have none of these options. It was your choice, your mistake, you live with it. Do not complain about lack of expertise, professionalism or poor products.

Good quality skilled expertise, information and products are there if you look for them – and are prepared to pay for them. Do your research, do not expect something for nothing.

At the Taunton Conference, March 2008, well intentioned participants, Brian Shingler, Anthony Battersby, and others, were complaining about the fact there was no recognised standard for hydropower consultants and practitioners. They wanted a list of trustworthy professionals that potential customers could approach for sound advice and build ability. **In effect they were**

acknowledging their own shortcomings, in the projects that they had commissioned. The faults they had made were of their own making. A LITTLE KNOWLEDGE IS A DANGEROUS THING, such are the lessons of life, do your research more thoroughly.

Regulation

A massive, and in many respects ineffective, bureaucracy already exists that acts to stifle hydro development in the UK. Planning departments at Local Authorities, Environment Agency, Electricity companies and distribution networks, even the DTI & DEFRA, all adding a very significant cost to potential projects.

Government, councils and regulators (EA) will have to employ and understand the technicalities of renewable energy. They will need to employ regulators who understand the issues and technology.

The organisation of any professional grouping needs to be undertaken with care. Collectively 'professionals' will seek to protect their own security and interests, before those of their customers. Additional layers of such bureaucracy and cost can thus be added to any undertaking by such groups, before any project is ever started. With small hydro the costs are already high.

In today's society we are governed, regulated and motivated by all the wrong people and desires. We live in a 'tick box culture' and mentality, with nobody to stand back and see how one box relates to another, or the wider picture ... or as is most relevant to any environmental undertaking - the holistic view. Society believes it can control and dictate to nature, but nature will always have the last word. The era of cheap energy is over, as is the availability of basic commodities and resources.

The Mendip Mills Group is only seeking to form what they already disapprove of in the BHA, and the BHA only want mill owners to add to their small membership. But the BHA

obtains the bulk of its funding from major players and the government.

Money is a means to an end; it is not an end in itself. Money used to be a measurement of a mans willingness to work and the value that he places on material goods and knowledge; now it is more a commodity that is simply printed.

Bearing these thoughts in mind – living with nature – hydropower, windpower, solar power, renewable energy generally, can all enable society to achieve a sustainable living standard. This will probably be a lesser material standard but probably more pleasant and rewarding than the present frenetic consumptive lifestyle that many “enjoy” at present. Without looking through rose tinted glasses, in time past, people lived and worked locally and may have been more contented.

We may not be able to put the clock back, but the clock does go full circle. Windpower went out of use but is returning. Canal transport similarly neglected now being restored. Trams, electric vehicles, bicycles were all a familiar sights a century ago and now returning. Meantime society has to relearn and rediscover the forgotten knowledge of a past era. In the case of small hydro this is not only the specifics of individual site design and installation but also the wider contexts and benefits of associated land and river management.

Too many citizens are willing to try and comply with the tick box culture mentality of government and the regulators. Eventually our society and economy will grind to a halt, and people may well rebel against this present structure of society. Form filling and passing sheets of paper from one person to another, and one department to another, will be recognised as an unnecessary waste of time.

The British Hydropower Association (BHA)

My understanding is that the BHA is a trade association, does not have any published professional standards, and, in my opinion, most of its members would fail to meet a best practice standard. The BHA would like to have the membership support of the 20,000 plus mill site / weir owners in the British Isles.

The BHA newsletter / website as I have seen it usually talks about EA regulators, Government Policy, bureaucracy etc and trade missions. Rarely if ever will you see here technical information on the subject of hydropower, choice of turbine, inlet screens and forebays, pipeline sizes and water velocities, electrical panels and controls.

The BHA has been promising along with the NRA/EA for over 10 years to produce a set of guide lines for small scale hydro installations, but neither can agree on the package.

Mill owners – particularly A Battersby have categorically stated they are unwilling to subscribe to such an association. They want to develop and have applied for grant aid to develop an on line solution, to exchange ideas and thoughts, at no expense to anyone. Hence no subscriptions. But the latest news is their grant application has failed. This is yet another example of millowners “something for nothing” approach to small hydro.

Grant aid is often confused with charity – there are good causes needing charitable assistance. But in the case of small hydro this is a business proposition, involving supplier and site developer. Such truly sustainable business enterprise, from supply to installation, should if correctly conducted be able to stand on its own two feet without any outside support.

How can we develop a hydropower industry with “Best Practice Standards” in the British Isles, with this wretched DIY approach. And why should the EA trust this DIY approach to hydropower.

In today's high tech society, whatever the product, it is better to go to the official representation or manufacturer, than the local inexperienced quack. You get what you pay for.

Many millowners seem to resent being told what they do not want to hear. They think it is rude and offensive to be told of their shortcomings.

In continental Europe engineers are held in high regard, and command better fees than in the British Isles, where engineers are thought more of as "greasy mechanics", rather than skilled artisans worthy of more respect.

In the British Isles, hydropower has traditionally come under the umbrella of the Institute of Civil Engineers. With so many gaining paper degrees and chartered status, the term "Chartered Engineer" in relation to hydropower has become devalued. There are in my opinion less than a handful of people worthy of this title in the British Isles.

One way of finding the right engineer is by way of their reputation. Go and see various sites and ask to talk to the owners regarding their experiences – design, construction, installation and operation.

- Keep your remit as simple and straightforward as possible.
- Try and understand the issues involved.
- Do plenty of research into practitioners reliability and trustworthiness.
- Don't part with money until you are convinced you have chosen the right engineers. But don't expect any work to be undertaken without payment, ie site visits, drawings etc.
- Be prepared to reach a compromise on your vision and the advice of the hydro engineer.

- Choose the turbine manufacturer you wish to employ, and put your faith in their suggestions.
- Do not start construction until you have approved drawings from the turbine manufacturer.
- **Don't mix information from different sources.**
- **Different manufacturers and their turbine types have different hydraulic requirements.**
- Only the turbine manufacturer you have chosen will be able to give you their physical requirements for dimensions, shapes, pipeline and forebay requirements, washout sluices, pipe sizes and pressure rises.

Financing Hydropower

Just like building your own house, hydropower is a high up front cost, which has to be financed minimally for 12 – 18 months before starting to produce any income.

If you have the money to carry this out properly, it may be a better and safer return than leaving it in a bank or pension fund.

If you have to borrow the money, depending on size and type of project (low head – high head) it may prove to be more of a burden than an investment. In addition to the anticipated cost you need a contingency fund for unforeseen circumstances. In today's inflationary economy prices continually rise, exchange rates vary, material and labour costs rise. Allow sufficient funds.

If you cannot afford to do the job properly then give it a miss. Bad projects only portray an unfortunate image for hydropower, which the EA is only too willingly to latch on to and criticize.

Dictionary Definitions

Professor – Public teacher of high rank, or, a title assumed by charlatans and quacks.

Profession – Often a non manual occupation requiring some degree of learning or training.

Charlatan – Someone who pretends to have special knowledge or ability.

Quack – Someone who claims and practices under the pretence of having knowledge and skill that they do not possess.

Chartered – One qualified under the rules of an Institute, which has received Royal Charter.

Engineer – One skilled in the design, construction and maintenance of engineering structures and power generation equipment.

Why I feel justified in commenting about those who complain about lack of professionalism in the British Hydropower industry.

Who am I – Osman Goring – Engineer, Mech., Elec., & Civil

To 1955 Educated at Ardingly College – Sussex

To 1961 Student apprentice at R A Lister – Blackstone, Diesel Engineers – mechanical & electrical 1.5 kw to 1.5 Mw

1962 Started my own engineering business at Coaley Mill

2008 46 years operating own hydropower plant, 25 kw 3ph.

UK representation for Ossberger for 31 years.

Founder member (1 of 7) who formed NAWPU (National Association of Water Power Users) in 1975 – now hijacked by government and renamed British Hydropower Association, BHA – a trade association.

The foregoing pages were written prior to August 20th 2008.

On August 22nd 2008 I received by email the objectives and plans of River Power Micro Hydro. Nothing I have read in the RPM notes suggests that I should change my thoughts. In fact only confirms the general theme of the RPM notes is one of unwillingness to spend their own money. Instead millowners want someone else to provide money for their own projects.

How do RPM members expect a hydropower industry to develop if they are unwilling to spend their own money?