The Global Need for Education

Patrick J Foster
Lecturer in Mining Engineering
Camborne School of Mines
Contents

• What Higher Education does for Quarrying
• Higher Education in the UK from a mining/quarrying perspective
• Worldwide Perspective
• What can/is being done to increase student numbers
What does HE do for the quarrying industry?

- Specialised Degree Courses;
  - Quarry Management, Mining Engineering
- Continued Professional Development;
  - Leading to PG Cert, PG Dip or MSc
- Short Courses;
- Products
- Research
Competence

• Quarries Regs (Reg 2) “with sufficient training, experience, knowledge and other qualities to enable them to properly undertake the duties assigned to them”.

• Our intention is to produce the high quality, competent managers of tomorrow.

• Design and manage quarry operations safely and efficiently.
Higher Education – Mining Engineering (1989)

- University of Nottingham;
- University of Leeds;
- Camborne School of Mines;
- Royal School of Mines;
- University of Strathclyde;
- University of Newcastle;
- University of Cardiff;
- North Staffs Polytechnic
Higher Education – Mining Engineering (1992)

- University of Nottingham;
- University of Leeds;
- Camborne School of Mines;
- Royal School of Mines;
- University of Strathclyde;
- University of Newcastle;
- University of Cardiff;
- North Staffs Polytechnic
Higher Education – Mining Engineering (2001)

- University of Nottingham;
- University of Leeds;
- Camborne School of Mines;
- Royal School of Mines;
- University of Strathclyde;
- University of Newcastle;
- University of Cardiff;
- North Staffs Polytechnic
Graduate Demand

- The big five quarrying companies take on between 25-30 graduates per year (combined);
- Smaller companies – unknown
Higher Education (Quarrying) 2002

- **Camborne School of Mines**
  - BEng(Hons) Mine & Quarry Engineering
  - BEng(Hons) Mineral Surveying & Resource Management

- **Doncaster College**
  - BSc Quarry Roadsurface & Design (stopped 01/02)
  - DAPS Course

- **Nottingham University**
  - BSc Quarry Management (stopped 01/02)

- **Leeds University**
  - BSc Quarry Management
Higher Education (Quarrying) 2004

• Camborne School of Mines
  – BEng(Hons) Mining Engineering

• Doncaster College
  – DAPS Course

• Leeds University
  – BSc Quarry Management
  – BEng(Hons) Mining & Minerals Engineering
  – Foundation Degree – Quarry Management & Tech
Short Courses & CPD

• Run EPIC approved Shotfiring & Blast Design Courses for Industry (CSM);
• Foundation Degree (Leeds)
• CPD Environmental Management (CSM)
• Joint MSc
H&S cd rom

Health & Safety Management in Quarries

Education Course Notes & Resource

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Research

“Accident Aetiology in the Quarrying Industry”

Looking at root causes from statistics (reactive) and potential risks/errors (proactive)
Research

Feasibility Study into use of Electronic Detonators to minimise vibration from blasting
Research

• Good-quarry website

www.goodquarry.com
The Problem

Supply vs Demand

- Demand for Jobs in the Minerals Resources Industry (UK & overseas);
- Students don’t want to study the subject;
- Less than 25 students in year 1 mining engineering in the UK.
The Problem

- Significant decline in school leavers studying maths, physics & chemistry
- Fewer students electing to study engineering
- Fewer choosing to study ‘resource’ related disciplines
- Introduction of Student Fees
The Problem

- Significant decline in school leavers studying maths, physics & chemistry
- Fewer students electing to study engineering
- Fewer choosing to study ‘resource’ related disciplines
- Introduction of Student Fees
Miners overtake City in pay league

By Angela Jameson
Industrial Correspondent

The depth of deals in the City during the past three years has cost financiers their lucrative position as the best-paid workers in Britain.

As once prodigal City bonuses dried up, oil workers and employees elsewhere in the mining and quarrying industry ranked as the best paid across the country last year.

The UK's 70,000 mining and quarrying workers earned on average £16,524 a week in the year to April 2003, up 10.7 per cent on the previous year.

In contrast, gross weekly earnings for those employed by financial services companies fell by 1.9 per cent to £16,254, according to official figures.

The difference in fortunes of the two highest-paid industries in the Office for National Statistics' New Earnings Survey was attributed to changes in bonuses and the fact that the mining sector includes workers within the well-paid offshore oil business.

Patrick Carroll, director-general of BACM-TEAM, the union that represents colliery management, expressed surprise that his industry appeared to be better paid than the financial sector.

"In the period since privatisation, wages in the pits have struggled to keep up with inflation. Some specific groups, like supervisors, have done better than others, but these figures do not tally with the general experience," Mr Carroll said.

Weekly pay in both mining and the financial sector far outstrips that in the lowest-paid industry, hotels and restaurants, where the average gross weekly wage is just £108.

The fall in City bonuses also helped women to close the pay gap on men, which began to open up again last year for the first time in four years. Women's average hourly pay is now 82 per cent of men's, up from 81 per cent last year.

Women's average full-time earnings have topped the £20,000 mark for the first time, but women still earn only 72 per cent of men's annual salaries. Male average earnings, which are more likely to be inflated by overtime, reached £28,365 in the year.

Katherine Rale, director of the Fawcett Society, which campaigns for equality between men and women, said: "Even if the pay gap continues to close at the same rate as it has over the past five years, it will take a further 85 years for the gap for full-timers to close completely."
UNSW Statistics

- UNSW trends are reflected nationally (similar trends at UQ & WASM)

- Supply is well short of demand (estimated national demand is 120-140 pa – current supply <100)

- Current shortage will continue at least until 2007/2008
The Future?

Industry need for:
- Competent Graduates;
- More focused CPD
<table>
<thead>
<tr>
<th>Old</th>
<th>New</th>
</tr>
</thead>
<tbody>
<tr>
<td>Conducted at fixed locations</td>
<td>Receive in own space</td>
</tr>
<tr>
<td>Conducted at fixed times</td>
<td>Receive in own time</td>
</tr>
<tr>
<td>Conducted at fixed pace</td>
<td>Learn at own pace</td>
</tr>
<tr>
<td>Fixed presenters</td>
<td>Presenters can be sourced globally</td>
</tr>
<tr>
<td>Face to face tutoring</td>
<td>Audio visual, chat room, etc tutoring</td>
</tr>
<tr>
<td>Fixed number of times delivered</td>
<td>Multiple replays</td>
</tr>
<tr>
<td>Linear/sequential programs</td>
<td>Non sequential programs</td>
</tr>
<tr>
<td>One to many</td>
<td>One to one, many to one, one to many</td>
</tr>
<tr>
<td>Practice confined to labs</td>
<td>Practice by labs, simulations, on the job</td>
</tr>
<tr>
<td>Students had limited interaction with academics and other institutions</td>
<td>Students have global interaction with learning providers, other students, other institutions, business</td>
</tr>
<tr>
<td>Fixed resources – lectures, books</td>
<td>Multi-media resources</td>
</tr>
<tr>
<td>Restricted library hours</td>
<td>24 hour access to resources</td>
</tr>
<tr>
<td>Class room based assessments</td>
<td>On line assessment</td>
</tr>
<tr>
<td>Fixed entry and exit</td>
<td>Flexible entry and exit</td>
</tr>
<tr>
<td>One size fits all</td>
<td>Learning tailored to student</td>
</tr>
<tr>
<td>Academic as teacher, judge and jury of learning process</td>
<td>Academic as facilitator of the learning process</td>
</tr>
</tbody>
</table>
The Future?

Industry need for:
• Competent Graduates;
• More focused CPD
• Pitch at MSc Level
Planned MSc

- MSc Quarry Operations & Management
- Developed by Leeds University & Camborne School of Mines;
- Flexible/Distance Learning;
- Provision for non-engineering/science based graduates;
- Modules are small enough for CPD;
- Underpinning knowledge.
- Initially EPSRC funded through MTA’s.
Modules

- Quarry Operations (CSM)
  - Quarry design, equipment, products
- Health & Safety Management (CSM)
  - Legislation, H&S management
- Finance (Leeds)
  - Management & financial accounting
- Materials Processing (Leeds)
  - Processing,
Modules

• Mineral Resources (Leeds);
  • Geology & marketing
• Geotechnics & Site Investigation (CSM)
  • Geotechnics, hazard appraisal
• Environmental Impact (Leeds);
  • Hazards, impacts, remidiation, EMS
• Quarry Engineering & Blasting (CSM).
Quarry Education

• DAPS Course
• Foundation Degree
• Undergraduate Degree
• Masters Degree
What can we do?
<table>
<thead>
<tr>
<th>Year</th>
<th>Possible Industry Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>15</td>
<td>Knowing</td>
</tr>
<tr>
<td></td>
<td>Contact with Local Schools (Vocational Training/Hillhead)</td>
</tr>
<tr>
<td>16</td>
<td>A Level Choices</td>
</tr>
<tr>
<td>17</td>
<td>HE Choices</td>
</tr>
<tr>
<td></td>
<td>Industry representation on University Taster Courses</td>
</tr>
<tr>
<td>18</td>
<td>HE &amp; Career Choices</td>
</tr>
<tr>
<td></td>
<td>Scholarships &amp; Bursaries</td>
</tr>
<tr>
<td>18-21</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Vocational Training/Vacation Employment &amp; Projects</td>
</tr>
</tbody>
</table>
The Future?

- **Short Term:**
  - Taster Courses
  - More dialogue with Industry;
  - Careers Sheets
  - Scholarships/Sponsorships.

- **Longer Term:**
  - Institute of Materials, Minerals & Mining;
    - A Level in Materials
    - Schools Affiliate Scheme
  - Earth Sciences Education Forum
Materials A Level

Diagram:
- Raw Minerals
- Industrial Materials
- Engineered Materials
- Waste
- Applications: Agriculture • Construction • Environmental • Defence • Information Communications • Transportation • Energy • Health

Processes:
- Explore Evaluate Mine Drill Harvest
- Recycle/Reuse
- Product Design Manufacture Assembly
- Process
The Future?

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