CONSTRUCTION ENGINEERING

TEACHING FOR A CAREER IN CONSTRUCTION

• Can it be learnt on the job? (It has been forever !)
• Would specialist degrees in construction management make for better equipped contractors?
• What is generally lacking in young engineers entering the construction market? (Or - what additional learning would assist them)
• Would (some) special teaching help, and how to fit it into the curriculum?
THOROUGHBREDS
Racehorses – Make Things Happen

CART HORSES
Solid Grafters – get the work done.
MULES?
No too many of these please.

CIVIL ENGINEERS IN CONSTRUCTION
USE ONLY 5% OF KNOWLEDGE LEARNT AT UNIVERSITY, BUT PLENTY OF THE SKILLS.
WHAT HAVE WE LEARNT AT UNIVERSITY

A) CONTRACTING ENGINEERS
• FUNDAMENTAL TOOLS OF APPLYING YOUR MIND TO FINDING SOLUTIONS FOR ANY IMPOSED CHALLENGE
• HARNESSING NATURE’s RESOURCES TO UPLIFT THE QUALITY OF LIFE

OR

B) CONCEPT

CONTRACTING ENGINEERS

ENGINEERING

• FUNDAMENTAL TOOLS OF APPLYING YOUR MIND TO FINDING SOLUTIONS FOR ANY IMPOSED CHALLENGE

• HARNESSING NATURE’s RESOURCES TO UPLIFT THE QUALITY OF LIFE

CONTRACTING

OPPORTUNITY TO APPLY THESE UNIQUE SKILLS IN A BUSINESS ENVIRONMENT (WITH A TWIST)
## PROCURING WORK

<table>
<thead>
<tr>
<th>CONSULTING</th>
<th>CONTRACTING</th>
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<tbody>
<tr>
<td><strong>Historically</strong></td>
<td><strong>• Competition / Tendering</strong></td>
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<tr>
<td>• Roster System / Speciality (Sell Time)</td>
<td>(Lowest Cost Operator in your weight division)</td>
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<td><strong>Recently</strong></td>
<td><strong>• Effect of Innovation</strong></td>
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<tr>
<td>• Tender for Services</td>
<td>(More you Innovate / Differentiate – More Profit you make – More you set yourself apart from your competitors)</td>
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<td><strong>• Tendering</strong></td>
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<tr>
<td>• Effect of Innovation (More you Innovate / Differentiate – Less Fees you receive)</td>
<td><strong>Risk</strong></td>
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<tr>
<td>• Tendering - Less time available to apply ones mind to the challenge - Short Cuts – Reduced Quality of Designs &amp; Documentation.</td>
<td><strong>Assess &amp; Embrace Risk</strong></td>
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<td>(Greater Risk / Greater the Opportunity)</td>
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**CONSULTING**
- Risk
- Eliminate Risk
- Conservative Designs
- F.O.S. (0,4 Fcu)

**CONTRACTING**
- Risk
- Assess & Embrace Risk
- (Greater Risk / Greater the Opportunity)
B.O.T., D.B.O.T. & P.P.P.’s
(DESIGN / BUILD / OPERATE & TRANSFER)
(PRIVATE SECTOR / PUBLIC SECTOR PARTNERSHIPS)

• 20 – 30 YEARS

• CLIENT COMES UP WITH SERVICE REQUIREMENT
• CONTRACTOR ASSEMBLES HIS TEAM
  • SPECIALISTS - LEGAL
  • FINANCIAL
  • TECHNICAL

B.O.T. / P.P.P.

• CONTRACTOR HAS A STRONG INFLUENCE IN FINAL DESIGN & OUTCOME
• STEER DESIGN THOUGHTS TOWARD MOST COST EFFECTIVE ICW SOLUTION
  (NOT NECESSARILY CHEAPEST!!!)
ADDITIONAL CONSTRUCTION LEARNING

• Legal/Legislation
  – Construction Regulations
  – Conditions of Employment
  – Environmental
  – Health and Safety
  – Commercial Legislation Affecting Construction Industry
  – Procurement Legislation

• Contractual
  – FIDIC
  – Alliance
  – NEC
  – Bespoke
  – Special Conditions of Contract
  – Standard Specifications
  – Project Specific Specifications

ADDITIONAL CONSTRUCTION LEARNING

• Commercial Skills / Aptitude / Accounting / Costing
• Planning / Programming
• Health & Safety
• Risk Assessments / Management
• Human Resources / People Leadership
• Communication Skills / Conflict Management
• Ethics
CONSTRUCTION MANAGERS