What do engineers do?

Who is an engineer?

What is engineering work?

Analysing Interviews

Q14b) Tell us about any planning or estimating work that you have to do.

> Yes, I have a fair bit of that. I have to prepare a schedule for our control applications and that means fitting in with the site schedules. I have to do resource levelling across seven different Alcoa sites.

Q14c) Tell us about any marketing or sales promotion work that you do.

> I don't have any formal marketing role. However, I do get involved when we are planning new jobs and looking for new work on the Alcoa sites.

Senior Consultant: it's a good idea to be thinking about new work all the time and think particularly about how you're going to package the work, how it is going to be delivered to the client.

Manager: we all get involved in sales support. Next week between 11 and 14 people are coming from Chile for a whole week. A lot of engineering teams come through.

Useful accounts in literature

Designing Engineers Bucciarelli (MIT, 1994)

On the Nature of Mechanical Engineering Work: Content and Process Holt, Solomon, Radcliffe (UQ,1991)

What do construction project planners do? Winch & Kelsey (UMIST, 2005)

Robots for Shearing Sheep: Shear Magic Trevelyan (UWA, 1992)

Codes – engineering roles

Code: E01 design

Create technical solutions to meet client needs from available resources and commercial off-the-shelf (COTS) components using specific technology expertise, design of new systems or components to meet client needs constrained by need to use available materials, production technologies and expertise.

Code: E02 review tech solution

Review / check technical solution; check documents and specifications against design codes, design requirements and client needs, quality, safety and environmental standards etc.

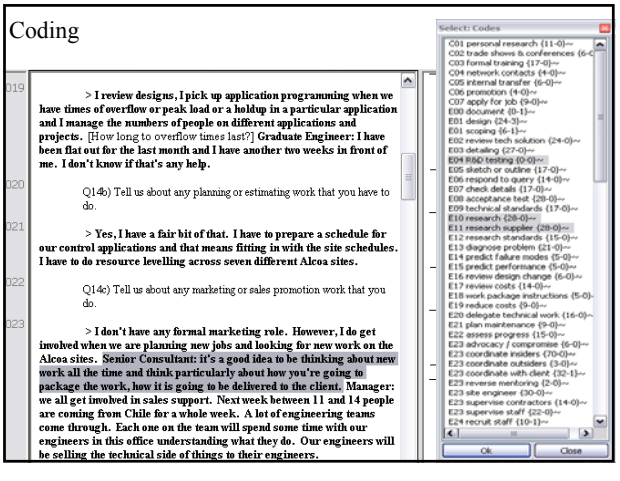
Code: E03 detailing

Document details, prepare and issue technical specifications, drawings, software code, circuit layouts and designs, etc.

Interview subjects

original qualification	current role	experience
chemical and process	control system projects	20
civil	structural design	4
civil	IT services management	35
civil	project consultant	32
electrical and controls	control software standards	33
electrical and computers	control software projects	8
mechanical	design	2
mechanical	business development	9
mechanical	technical standards	12
mechatronics	building services	7
mechatronics	software	1.5

Coding



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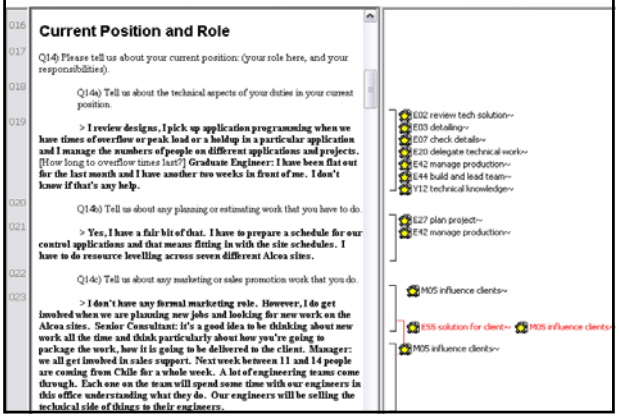

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Date/Time: 31/03/05 09:06:15 AM
16 quotation(s) found for Query (Infix-Notation):
"E50 networking"
…..
…..

The busiest time is the initial kickoff. When we are communicating with the site people on almost an hourly basis. This happens at the start of each project. Once we are up and running the workload returns to more normal levels but it ramps up again closer to the end of the project. This is when we are trying to get everything signed off, every issue addressed. It is always harder with newer things -- familiarity makes everything easier. It gets very tough when there are problems at the site. Often there are issues internal to the site organisation, issues over which you have no control whatsoever. Then it is really important to keep the relationships going. You spend a lot of time working out how to try and influence people you don't have any control over at all. The only way you can do that is by maintaining excellent communications. (A008/52)

Codes: [E16 review design change] [E23 coordinate insiders] [E23 coordinate with client] [E50 networking] [E53 completion report]

Roles missing from original list

review contract terms
invoicing & debt collection
networking
evaluate tenders, procurement
report progress
completion report
inspect work
solution for client
configuration management
research client rules
check satisfaction

Editing and seeing links

E53 Completion reporting

Report completion, prepare payment requests, prepare documentation, file test reports, installation logs.

This role is closely linked with the technical role of commissioning and acceptance testing and inspection (E08) and also with procurement (E51).

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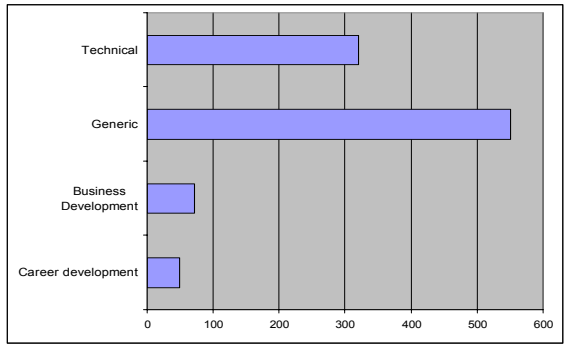
Reshaping roles - examples

liaise with clients +
supervision ⇒ coordinate insiders
coordinate with client
coordinate outsiders
supervise staff
reverse mentoring
advocacy / compromise
supervise contractors

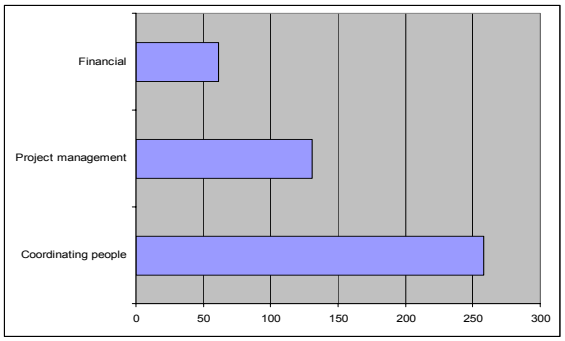
prepare job description +
assess qualifications +
recruit staff ⇒ recruit staff

research client needs +
assist clients +
marketing ⇒ influence clients

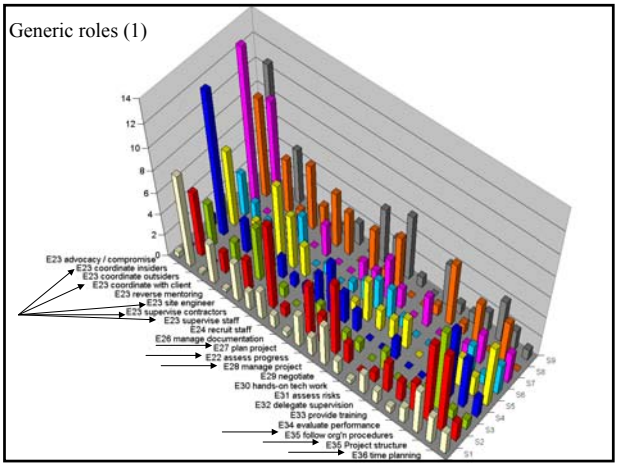
Number of references to different roles



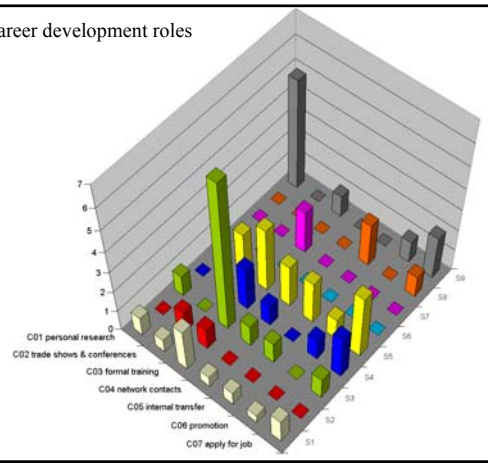
Number of references to generic roles



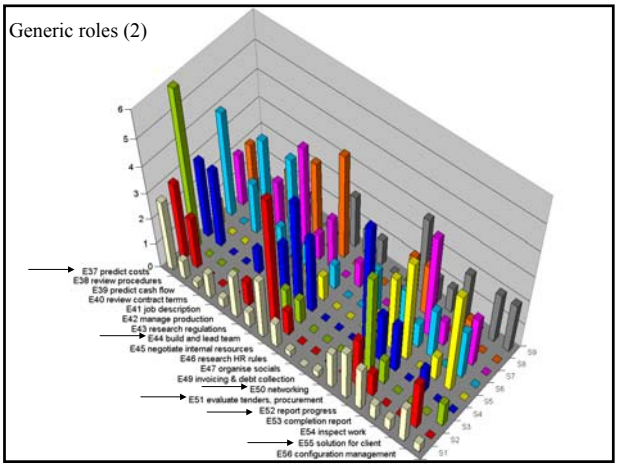
Generic roles (1)



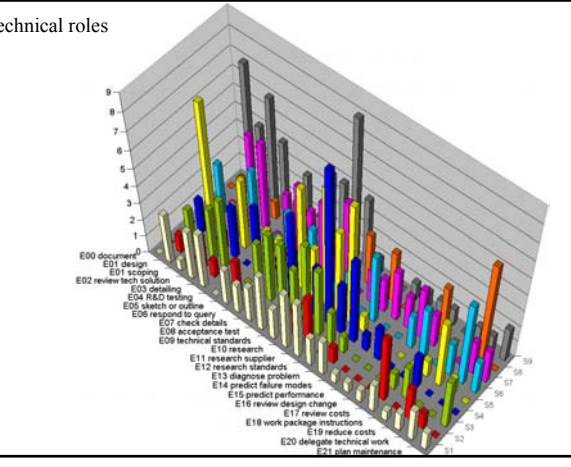
Career development roles



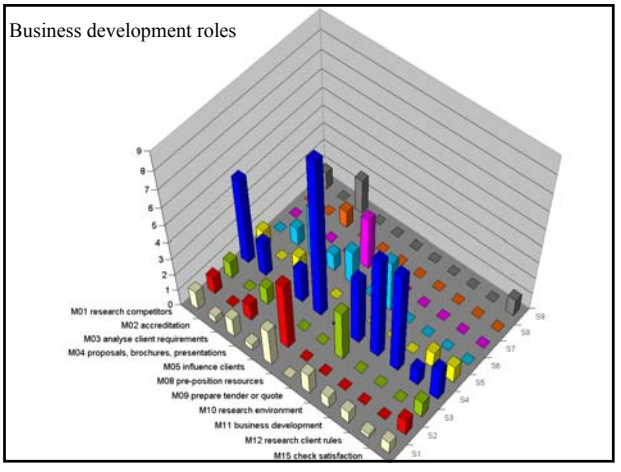
Generic roles (2)



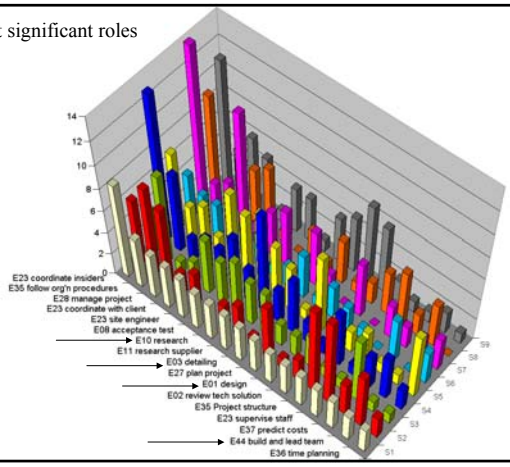
Technical roles



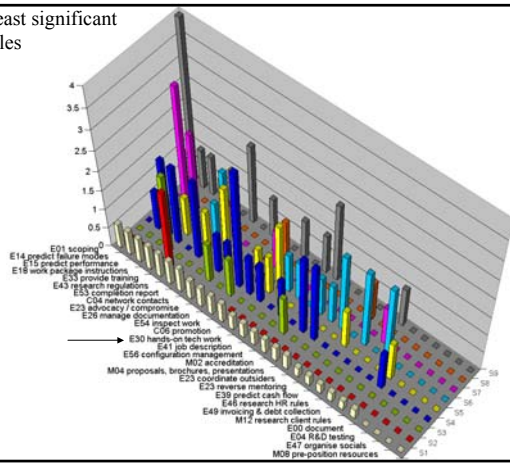
Business development roles



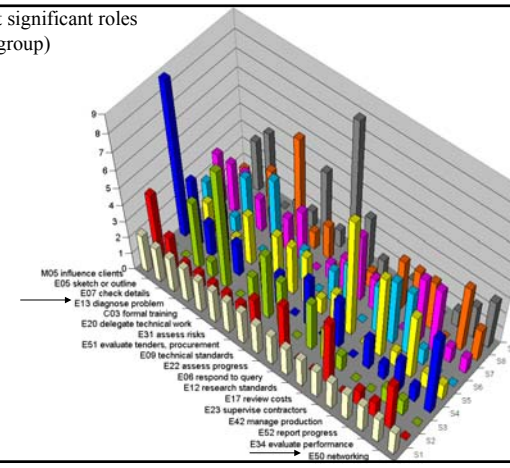
Most significant roles



Least significant roles



Most significant roles (2nd group)



Interesting issues

Engineering education – what's missing?

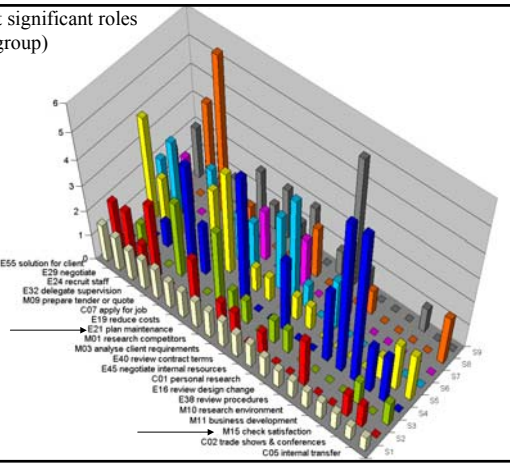
Technical knowledge

Procedures

Missing management roles…..(Mintzberg 1994)

- •Managing self, internally (reflection, strategic thinking)
- •Leading the organisation/unit (organising, merging, building culture, managing change)
- •Communicating nonverbally (seeing [visual literacy], sensing [visceral literacy])

Most significant roles (3rd group)



Still to be investigated

government policy-making
government regulatory authorities
utilities
consultancies
defence forces, military engineering
sales engineers, component and service suppliers
rehabilitation and health
manufacturing,
production
local government
maintenance
contracts management
planning
estimating