

Creating Work force for EMS – A Pipelining Approach

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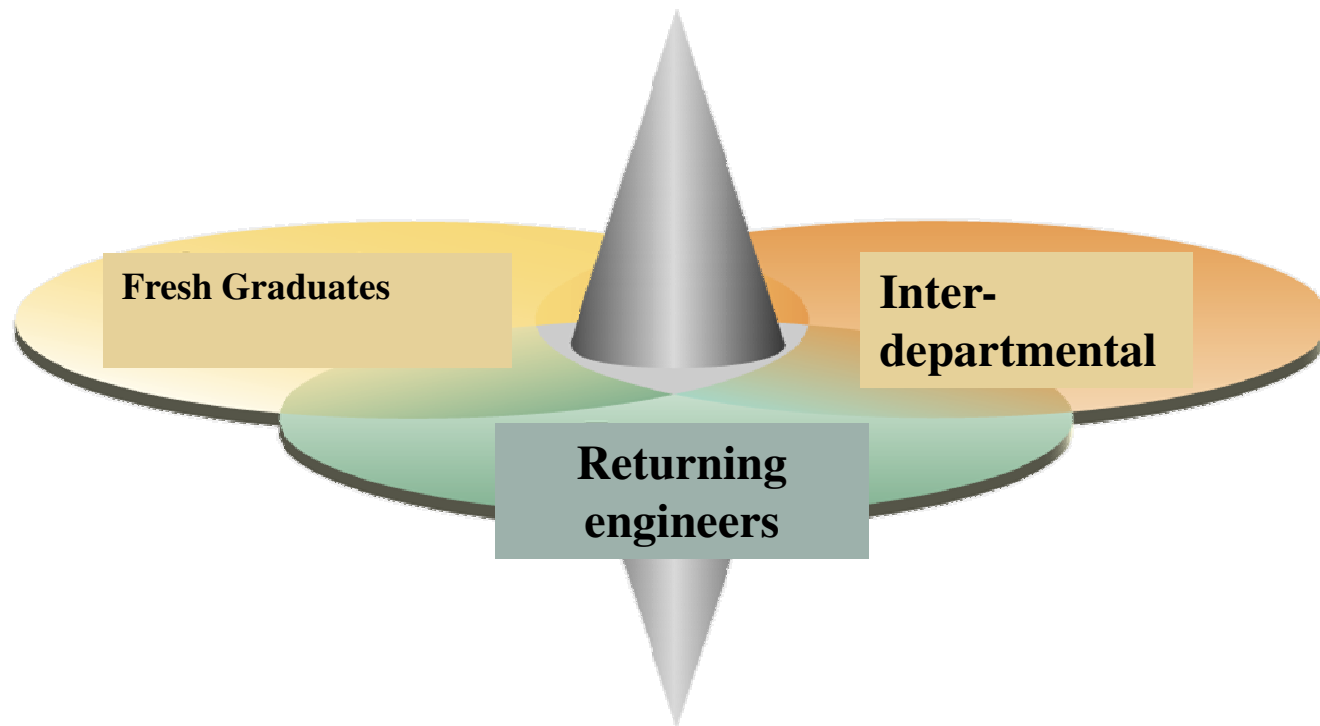
Agenda

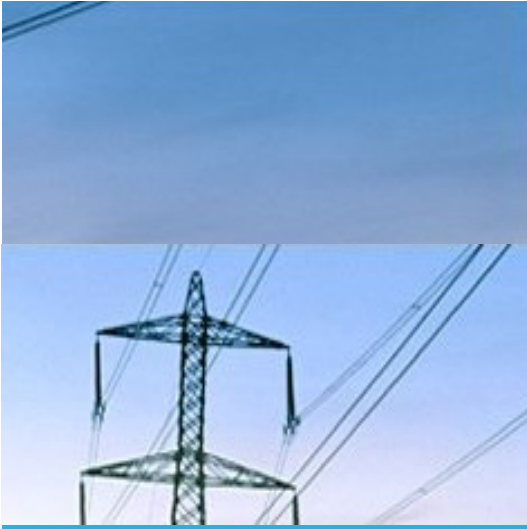
1. Overview of the EMS staffing problem
2. Potential sources
3. The Boot-camp approach
4. Contents of the boot-camp
5. Q & A



Our Position

Potential sources





Gaps

- Fresh Graduates: The Masters programs have limited coverage.
- Inter-departmental: Need a quick appreciation of the concepts.
- Returning engineers: Need a quick refresher.



A boot-camp approach to produce EMS engineers

- Duration: 2-4 weeks
- Number of engineers/ batch: 4 to 6
- Face-to-face delivery
- Training on a real system



Design process

- Examined typical requirements of EMS engineer job postings
- Validated the qualifications stipulated
 - ❖ All specified qualifications would be impossible to find in any one individual!
- Generated a common denominator for the skills required
- Assessed the gaps
- Brainstormed on delivery mechanism: Faculty, on-line/ face-to-face, Technologies/ Platform/ Prototyping the concept
- Designed the content for the boot-camp



Delivery Mechanism

- Key faculty to provide face-to-face training
- Integration of available materials: Notes, Wiki, YouTube, Open Sources
- Hands-on exposure to Actual system/ Simulators
- Group discussions/ quizzes





Categorization of tasks

System and Development Support

Modeling Support

Operations Support

- Generation Applications

- Network Applications

- Market Applications

Compliance/ Reporting



Contents

**Control Center
Concepts
(16 hrs)**

**System
Support
(24 hrs)**

**Network
Support
(24 hrs)**

**Generation
Support
(24 hrs)**

**Market
Support
(24 hrs)**

Hierarchy of Control Centers – RTO/ ISO/ Transmission/ Distribution

Functions at each level

Overview of Control Systems –Open loop/ Closed-loop

States of Power Systems and Priorities

Importance of Human Operator

Compliance



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SCADA Components – DACS, Central System

UI Support – Existing/ Trends

SCADA/ ICCP/ Historian configuration

Product Upgrades and road map

System Debugging

Compliance



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Network Applications – SE, Contingency Analysis, OLF

Data Base – Linkage with SCADA/ UI

Interpretation of results

Dynamic ratings, VSAT, TSAT

Debugging and Resolving Modeling Issues

Compliance



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AGC, ELD, OPF

Generation UI development and Support

Unit control tuning – pulse control

Joint-owned Units/ Timers- NOX/ Balance Authority/ RTO

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SCED, UC

Market Fundamentals

Locational Marginal Pricing

Data Base Generation and Maintenance

Debugging and Resolving Modeling Issues

Compliance



Tools/ Modeling/ Advanced Topics

Common Information Model

OS: Linux/ Unix, Windows

Programming - PERL, C, C++, ORACLE, SQL, FORTRAN, XML

Historian - PI

GE PSLF/ PSSE/ PowerWorld

Smart Grids - Synchrophasors

Situational Awareness



Some thoughts for the future

- Identify faculty - Recently retired EMS engineers
- Packaging for future retrieval – Content Management
- Integration of operations manuals from Utilities
- Extend the core concept to other areas like Compliance, Smart Grid, Distribution Management, etc.
- Refresher camps



Q & A