

Typical Career Development Plan For Future Expert Machinery Engineers By Heinz Bloch, P.E.

I. NEW ENGINEER

(Plant mechanical engineer hire), years 1 and 2, possibly years 1 through 5

A. On-the-Job Training

Rotational assignments within the plant in various groups to be exposed to different job functions for familiarization. Areas to be covered should include machinery, mechanical, inspection, electrical, instrumentation, operations, maintenance, etc.

B. In-house training (Applicable to headquarters/central engineering locations)

- Plant and/or corporate standards development/revisions and updates
- Courses in the above
- Courses dealing with industry standards (API, NEMA ,etc.)
- Machinery (compressors, pumps, steam and gas turbines, gears, turboexpanders, etc., per Ref. 3 through 6)
- Failure analysis and troubleshooting (Seven Root Cause method, "FRETT" per Ref. 7)
- Practical lubrication technology for machinery (per Ref. 8)
- Machinery vibration monitoring and optimized analysis (per Ref. 9)
- Predictive monitoring (lube oil analysis, valve temperature monitoring, etc.).

C. Outside Training Pursuits (Suggested minimum once/yr, preferred frequency twice/yr)

1. General vendor-type information courses. Examples:
 - GE gas-turbine-maintenance seminar
 - Major mechanical-seal-manufacturers' training courses
 - Elliott compressor technology, selection, application and maintenance seminar
 - Compressor Control Corporation and Woodward Governor Company course
 - Major turbomachinery manufacturer's lube and seal oil systems maintenance course
 - Coupling manufacturer's training course, etc.
2. Texas A&M University Turbomachinery Symposium
3. Texas A&M University International Pump Users Symposium
4. Center for Professional Advancement Public Courses
 - Machinery Failure Analysis and Prevention
 - Machinery Maintenance Cost Saving Opportunities
 - Compressor and Steam Turbine Technology
 - Machinery for Process Plants
 - Reciprocating Compressor Operation and Maintenance
 - Piping Technology
 - Practical Mechanical Engineering Calculation Methods
5. Hydrocarbon Processing International Process Plant Reliability Conference

D. Personal Training (Mandatory review of tables of contents of applicable trade journals,

books, conference proceedings, etc. Mandatory collection and cataloging of copies of articles that are of potential future value). Here some examples of such trade journals:

<i>Hydrocarbon Processing</i>	<i>Mechanical Engineering</i>
<i>Diesel Progress</i>	<i>Oil and Gas Journal</i>
<i>Diesel & Gas Turbine Worldwide</i>	<i>Chemical Engineering</i>
<i>Distributed Power</i>	<i>Control</i>
<i>Sound and Vibration</i>	<i>Gas Turbine World</i>
<i>Lubes and Greases</i>	<i>Chemical Processing</i>
<i>Sulzer Technical Review</i>	<i>Mitsubishi Technical Review</i>
<i>Hydraulics and Pneumatics</i>	<i>Motion Systems Consultant</i>
<i>Power Engineering</i>	<i>P/PM Technology</i>
<i>World Pumps</i>	<i>Pumps & Systems</i>
<i>Compressed Air</i>	<i>Evolution (SKF Publication)</i>
<i>Practicing Oil Analysis</i>	<i>NASA Tech Briefs</i>
<i>Compressor Tech Two</i>	<i>Plant Services</i>

Books to be reviewed should include texts on machinery reliability assessment (which include checklists and procedures (Ref. 10 and 11) and popular texts on pumps (Ref. 12, Weibull analysis, reciprocating and metering pumps, electric motor texts, books dealing with gear technology, etc.)

II. INTERMEDIATE ENGINEER

(Plant Mechanical/Machinery Engineer), years 3 through 5, possibly 3 through 8.

A. Rotational Assignment. Two-year assignment at affiliate location, possibly at central engineering, or headquarters.

- Involvement in field troubleshooting and upgrading issues
- Familiarization with equipment, work procedures, data logging practices, etc.
- Spare parts procurement practices (probability studies)
- Life-cycle costing involvement
- Maintainability and surveillability input
- Structured networking involvement (provide feedback to other groups).

B. Outside Training Pursuits.

- Extension of earlier exposure
- Attendance at relevant trade shows and exhibitions (provide feedback to others)
- Attendance at ASME, NPRA, STLE and related conferences (provide feedback)
- Speaker at local ASME/STLE/Vibration Institute meetings.

C. Personal Training and Continuing Education.

- Develop short articles for trade journals and/or similar publications
- Develop short courses (initial aim: in-plant presentations, intra-affiliate presentations)
- Advanced self-study of material on probability, statistics, automation, mgmt. of change
- Studies in applicable economics.

III. ADVANCED ENGINEER

(Corporate Specialist, Core Engineering Specialist), years 9 and later, depending on exposure and achievements under IIA/B/C, above)

- International conferences (speaker/participant)
- Peer group interfaces (e.g. on discussion panels, industry standards committees, etc.)
- Develop and present technical papers at national/international engineering conferences
- Pursue book publishing opportunities (case histories, teaching tools, work procedures)
- Regular contributions to trade journals
- Development of consultant skills.