The Reliability and Maintenance Workforce in 2016

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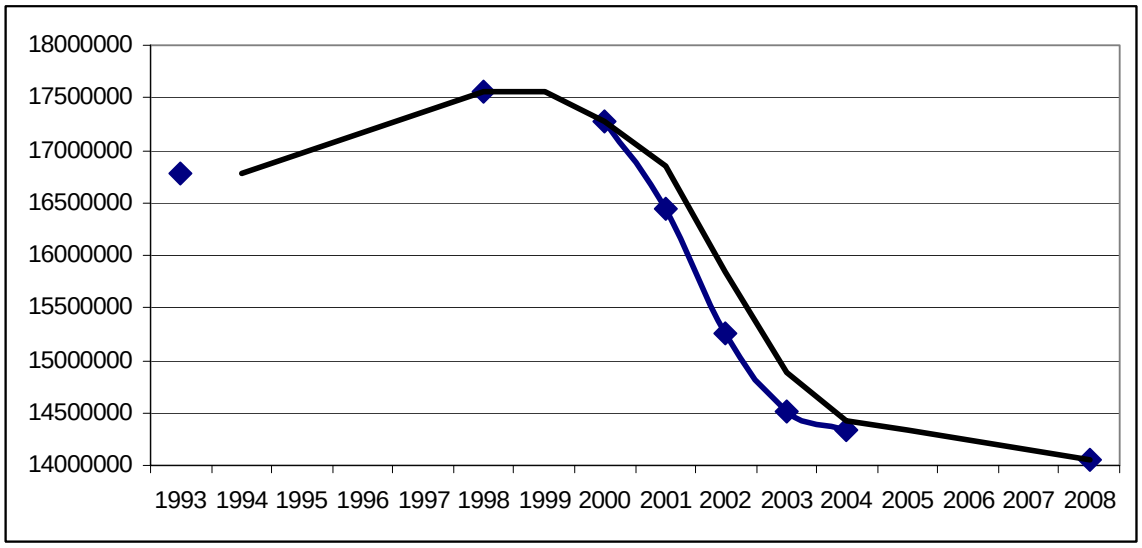
The US Census Bureau's Bureau of Labor Statistics (BLS) has cited that there will be a workforce available to replace the existing workforce, in numbers, and that the skilled and experienced workforce will grow dramatically in the 55 and older category through 2014. However, there is also an expected decrease in skilled worker demand across all industry and manufacturing sectors during the same period. Sixty percent of new job growth will be split into high paying, high education positions, such as engineering, medical services and computer science, and low paying, low education service industries. In effect, there will be a change to the USA middle class that had emerged at the beginning of the 20th Century, with a greater definition of upper and lower classes. The concept goes along with the increase of students entering higher education and the decrease of those same young adults, ages 16 through 24, entering industry. The BLS estimates that the number of 16 and 24 year olds entering the workforce will remain the same as 2004 levels. The period between 2015 and 2024 will see a gradual increase in available skilled workers as the 'baby-boom echo' generation begins to enter the workforce. These are the children of a vast majority of baby-boomers that waited until their later years to have children.

Figure 1: Manufacturing Employment in the USA (All Labor)



With modern existing technologies and new advances in manufacturing technologies and philosophies, we can expect to see changes in 21st Century industry and manufacturing. Many of these changes will involve advanced technology in automation and other practices that will reduce the skill level requirements for manufacturing, including Reliability and Maintenance (R&M), and, in some cases, will remove the human element altogether. While this evolution may not be easily accepted by many, it is one of several inevitable changes, such as the movement of the manufacturing of a growing number of

commodity industries outside of the USA. As these changes have been taking place since the 1980's, the American workforce has adapted to the knowledge that having to move jobs over their careers is now a way of life.

Figure 2: Change in Workforce (in 1,000's) by Age Group from 2004 – 2014[1]

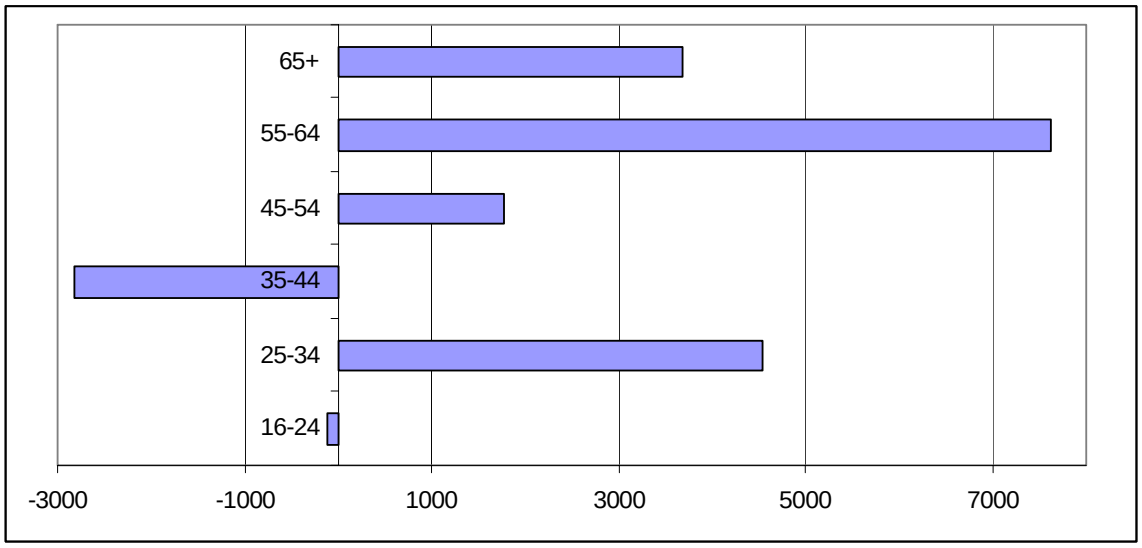
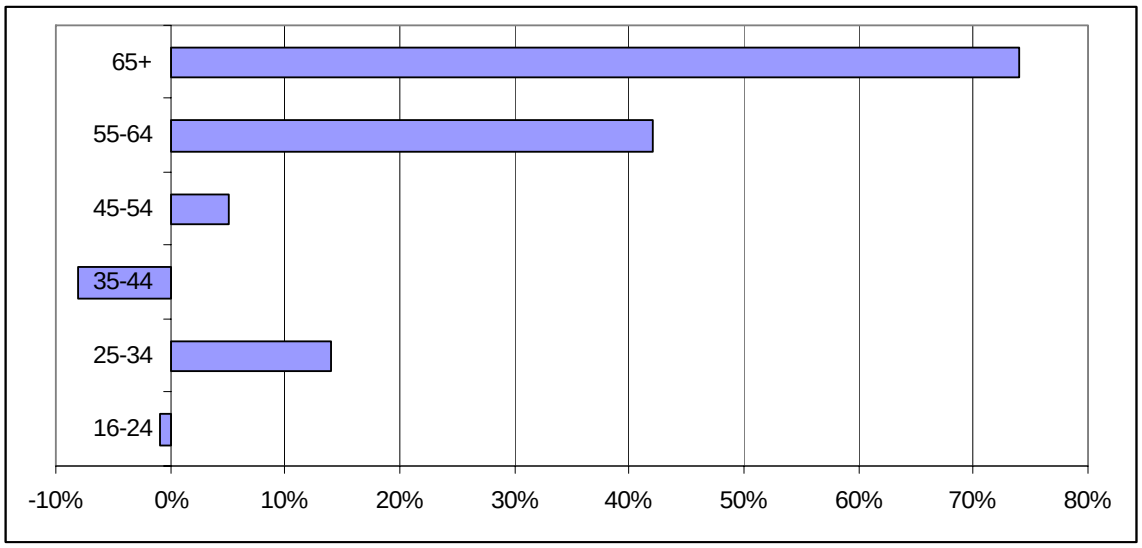


Figure 3: Percent Change in Workforce 2004 to 2014[2]



With these changes, the type of skilled workforce required for R&M can also be expected to evolve. It is expected that the future R&M workforce will include three classifications (and variations):

[1] US Bureau of Labor Statistics, "Labor Force Projections," Occupational Outlook Quarterly, Winter 2005-2006

[2] US Bureau of Labor Statistics, "Labor Force Projections," Occupational Outlook Quarterly, Winter 2005-2006

1. The General Maintenance Worker: Will perform basic tasks in either a particular craft or general tasks. Often will require the direction of a skilled tradesperson or knowledge worker in the performance of tasks, or, for planned maintenance, written procedures. Training is mainly provided as On-the-Job Training (OJT). The general maintenance worker will have limited formal education and will perform as a maintenance laborer;
2. The skilled tradesman may be a journeyman or master of his/her particular craft and will have some level of skill and experience necessary to perform planned maintenance, corrective maintenance and construction. May be internal workers or contracted, but will be task oriented. Skilled tradesmen will generally have OJT, formal training or an apprenticeship. Their skills will be transferable and in a reasonable level of demand;
3. The knowledge worker:
    a. Is the top tier R&M specialist for one or more skills within the company that are also transferable within one or more industries. The particular skill-set found in knowledge workers include, but are not limited to:
        i. Solution and value oriented;
        ii. Uses technology as a tool;
        iii. Continuous/life-long learning. Keeps up to date on new and upcoming advances;
        iv. Understands aspects of asset management;
        v. Strong work ethic and internal/external customer service;
        vi. Education and Experience; and,
        vii. Is a leader, coach (mentor) and supports efforts within the company.
    b. Knowledge workers:
        i. Are mobile and are in demand. They can leave as required;
        ii. Job satisfaction and training opportunities are usually required to retain. As they are in demand, they command a higher salary, but financial awards, alone, will not retain them;
        iii. They are partners and cannot be 'ordered.' They must usually be persuaded;
        iv. They tend to pay for themselves many times over;
        v. Self directed;
        vi. Process oriented; and,
        vii. May be internal, service or consultants.

Knowledge workers must be identified and nurtured by their management. In fact, management must approach the skilled workforce of the 21st Century with a new paradigm. A few concepts that must be considered by management include:

- ☑ Maintenance policies should be formulated by the people closest to the assets;
- ☑ A successful, lasting maintenance program can only be developed by the maintainers and users of the assets working together; and,
- ☑ Knowledge workers must be developed and nurtured.

The primary methods for developing and retaining knowledge workers are:

- ☑ Involve the knowledge worker, or developing knowledge worker, within management decisions related to reliability and maintenance. Make him/her a partner in decisions related to asset management;
- ☑ In addition to an appropriate salary and benefit package, the knowledge worker will expect access to training, seminars, conferences, involvement in trade-related standards and certification programs and having an impact on the industry;
- ☑ Ideas must be heard and considered. Quick decisions are important as the knowledge worker tends to be result oriented; and,
- ☑ Flexibility and freedom to do what must be done with little or no supervision. Most knowledge workers are entrepreneurial and take pride in success.

Organizations have already gone through drastic transformations in workforce and quality improvements like Six Sigma, Lean, Quality Revolutions and ISO 9000. Most resources have been deployed on manufacturing and process infrastructure improvements with little concern about R&M. In fact, one of the last bastions that allows for dramatic improvement of the productivity of company assets is best practices in R&M. Smart companies are quickly finding that the journey toward best practices in physical asset management pays big dividends. Unfortunately for many - this realization will happen too slowly as the available resources, primarily skilled experienced R&M experts will be in shorter supply. The convergence of short supply and increased need will demand superior recruiting and more detailed planning than ever before.

The future holds great promise for knowledge workers in the field of R&M. As the shortage of both high level and lower level skills becomes more pronounced, the competition to hire or contract with these knowledge workers will intensify. Companies that use cost to drive maintenance decisions rather than best practices will loose knowledge workers and see costs skyrocket. Companies that attract knowledge workers and implement best practices will see increased profits through higher availability and increased output, lower scrap rates, higher quality product, and finally lower maintenance labor and material cost.

Companies that hire and retain the right R&M workforce, create an environment that empowers the knowledge worker, and leverage available technologies will reap the rewards. The companies that wait to read about the Reliability Revolution on the front pages of national and international news media will be far too late!

In the meantime, with changes to the R&M industry and existing projects and research, the following scenario will begin to be observed within industry, by 2016:

Remote sensors on critical machines are connected using WiFi, bluetooth, or some other wired and/or wireless means, to central locations which may be within a facility or support a group of facilities. The system will use history, or a form of neural network system, to analyze issues on its own, determine the best solution, alert stake holders,

generate a work order and find or order parts. When possible, it will make changes to the operations and adjust due dates, etc., while informing sales and customer service personnel. Where the system requires, it will call upon company, or contracted, knowledge workers for direct analysis. Onsite maintenance personnel will be used to perform routine maintenance, collect additional data for analysis and perform corrective maintenance. The central organization supports onsite personnel with either, or both, additional personnel, such as a roving maintenance group, or by obtaining information and technical support.

Is this a realistic prediction? Such systems have been in development since the mid-1990's within military and university research. The technologies, sensors and communication systems exist right now and a number of corporations have been utilizing remote data collection and analysis systems for years while others are experimenting with them now.

At last, we are leaving the dark ages of R&M and looking to a new, adventurous, challenging and exciting future.

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