Training Need of Indian Wind Turbine Manufacturing Sector – An Intimate Study

Debasis Gupta\textsuperscript{1} & Dr. Rajat Goel\textsuperscript{2}
\textsuperscript{1}PhD research scholar, Mewar University, Rajasthan, India,
\textsuperscript{2}Research Supervisor, Mewar University, Rajasthan, India.

Introduction

The growth of wind energy has again started in India. The market is expected to grow year on year and thus needs trained professionals to satisfy the market demand. For last 18 years I am closely attached to this industry and researching on the technique of wind turbine manufacturing process as a part of my job. This write up shows the present training structure prevailing in Indian wind turbine manufacturing industry and proposes a blueprint for the improvement to match the growth demand of windmill industry.

About Windmill Industry in India

The development of wind power in India began in the 1990s, and has significantly increased in the last few decades. Although a relative newcomer to the wind industry compared with Denmark or the United States, India has the fifth largest installed wind power capacity in the world. In 2009-10 India’s growth rate was highest among the other top four countries.

The MNRE has announced a revised estimation of the potential wind resource in India from 49,130 MW assessed at 50m Hub heights to 102,788 MW assessed at 80m Hub height. The wind resource at higher Hub heights that are prevailing is possibly even more. In the year 2015, the MNRE set the target for Wind Power generation capacity by the year 2022 at 60,000 MW.

Need and justification of the topic

This topic focuses on to equip the present and future work force with requisite skill and knowledge, so that they can be committed to high productivity with quality at work, thus help the Renewable Energy (Wind) industry to grow in India.

We have seen, worldwide double digit growth has become standard for wind energy in general. Now the industry is running in high gear to keep up with the promise cited by the Indian Prime Minister in Paris Clemet Change Agreement held in the months of November-December in 2016. India has committed that by 2030, at least 40% of its electricity will be generated from non-fossil sources. This includes 175GW renewable energy capacity by 2022. Out of which 60GW will be drawn from wind energy. Therefore this year onwards it is expected that the Indian wind industry will also grow substantially. It is planned to add 30GW wind power in next five years.

To become competitive in this business, wind turbine production cost has to be controlled to a maximum possible level. Enormous improvement in productivity and manufacturing quality will play an important role to achieve this goal. Existing and future professionals have to focus seriously in acquiring newer techniques, along with re-sharpening continuously the already acquired skills.

Unfortunately, probably none of the windmill manufacturers in India so far have taken any recognizable step towards the manufacturing process training of their workforce. Some of them have established training institutes but those efforts are very limited and not really focusing towards the improvement of manufacturing skill of professionals. Those institutes are majorly aimed to develop professionals working in the field of wind turbine operation & maintenance. In my view, it is necessary but, continuous improvement of manufacturing process and quality is also of prime importance.

In Europe, many institutes are working in it for long. They regularly conduct many programs and works closely together with the industry.

In India, we find, very few institutes have their courses designed for wind industry. As example, one of them is The Energy and Resources Institute (TERI). TERI runs M.Tech programme in renewable energy Engineering & Management. This program addresses the technical, management, policy, regulatory, and economic aspects of renewable energy sector. But it doesn’t give any impetus towards the manufacturing process of wind turbines.

National Institute of Wind Energy (NIWE) conducts various trainings like:

- Wind Resource Modeling Techniques, Wind Speed Statistics and Energy Calculations,
• Micro-siting and layout of wind farms, Wind Resource Measurement, Wind Turbine Technology, Design and Safety requirements as per standards, O & M practices.”

Here also, no training module has been developed to impart training/advanced training in wind turbine manufacturing processes and techniques.

Requirement of manufacturing level engineering work force to run the manufacturing business is expected to grow consistently. Therefore, there is a crying need to work on this ignored area at this point of time.

A quick and structured program for wind turbine manufacturing professional development is needed to be developed by all manufacturers. More and more Technical institutes should also come forward and design vocational courses like “windmill fitter”, “windmill electrician” etc. Courses to train Engineers especially on windmill manufacturing have to be developed.

Training blue print

While working on a blue print, let us first have a relook in the fundamentals of training. The training process starts with:

➢ Identifying the business strategy.
➢ Next, strategic training and development initiatives that support the strategy are selected.
➢ Translating these training and development initiatives into concrete training and development activities is the next step of the process.
➢ The final step involves identifying the measures or metrics.

These metrics are used to ascertain if training helped to contribute to goals related to the business strategy.

Inside the windmill manufacturing organization:

A Systematic Approach to Training is to be established and executed.

Identifying training needs:

A sequential arrangement of quotes from some renowned personalities can paint a very clear picture about the training need identification.

➢ A needs assessment is conducted to determine which individuals need training or development and what type of skills or knowledge they need to obtain (Jones and George, 2008).
➢ It usually involves organizational analyses, person analyses and task analyses (Noe, 2008).
➢ Organizational analyses – has to do with, amongst others, an examination of organizational goals, resources of the organization, transfer climate for training, and internal and external constraints present in the environment (Goldstein and Ford, 2002).
➢ Task analyses – identifies the main tasks and knowledge, skill, and behaviours that need to be highlighted in training for employees to complete their tasks (Noe, 2008).
➢ Person analysis – concentrates on whether the individual employees need training and exactly what training is required (Goldstein and Ford, 2002).

Within the wind industry step-by-step approaches, models & methodology for implementing the entire process of skill development and change at operator’s level needs to be initiated.

People come from a wide range of geography backgrounds and all should get the opportunity to grow and develop. Therefore regular evaluation of the performance of employees in order to foresee any possible skills shortages, which in turn will help the industry to decide whether they have the correct knowledge, skills, understanding and resources to carry out the business effectively in the highly demanding scenario.

Individual development program (IDP)

Mathis and Jackson (2004) says that after training needs have been identified, training objectives and priorities must then be established by identifying a gap analysis, which shows the distance between where an organization is with its employee capabilities and where it wants to be. Training objectives and priorities are established to close the gap.

Therefore, once the training need analysis (TNA) has been done through a systematic process, individual development program (IDP) have to be chalked out in consultation with the functional superiors. A versatility matrix will also have to be prepared for individual employees.

Annual training plan

After preparing Individual training sheets, HR have...
to prepare Annual Training Plan and display the same. The Annual Training Calendar shall include all employees at the location. After freezing Annual Training Calendar, the date wise Monthly Calendar is to be prepared and circulated to the entire team through E-mails on 1st day of every month and also displayed on the notice boards. Based on these monthly plans trainings, in-house, OJT as well as, external courses are to be organized.

**Training design**

When training objectives have been determined, training design can be carried out (Mathis and Jackson, 2004). The appropriate design work can be done by members of the organization’s HR or training team or by an outside training provider or consultant. The choice of who carries out the design work will be determined by the type of training required, the target audience, the resources available and the timescales (Bailey, 1999). Mathis and Jackson (2004) stresses that, the trainers must design training program for the highest possible transfer of knowledge. They explain that this transfer occurs when trainees really use what they learned in training on the job.

**Evaluation of training**

To measure the effectiveness of the training, an efficacy evaluation on the training is to be done in two levels:

- **Immediate feedback by Trainee** – The immediate feedback on the effectiveness of the training program attended by the employee to be gathered through the Training Evaluation Form immediately on the same day after completion of the training workshop.

- **Intermediate Term feedback by Supervisor** – After about two months of training program, the post-job training evaluation on efficacy shall be done through immediate supervisor in the prescribed format. Monthly training program are to be monitored very closely in terms of planned trainings vs. actual trainings and planned man hours vs. actual man hours and the same has to be reviewed by the Head- HR.

**Outside the windmill manufacturing organization:**

In this context let us look in to the Windskill project. Windskill iwas an EU Intelligent Europe sponsored project which aimed at overcoming the lack of sufficiently skilled and internationally qualified wind energy technicians. The Windskill initiative targets were enrolling authorities and sector stakeholders in the development of a European Qualification Profile, develop an appropriate modularized curriculum and set up pilot training courses to meet these requirements.

Key objectives of Windskill were:

- (i) Set up an industry-based skills network for the wind energy sector
- (ii) Develop a qualification standard for operational skills in the wind energy sector.
- (iii) Enrich the skill pool of the wind energy sector.

It doesn’t come as a surprise when, in a recent report published in Asia Wind Energy Association journal , it again highlights the same issue. The report, produced by Air Swift and Energy Job line, surveyed over 16,000 professionals worldwide within the oil and gas, renewables, power, nuclear and petrochemicals sectors. The survey shows that 75% of hiring managers in the clean energy industry would hire workers from other sectors.

**Situation in India is no different.** We already have discussed the prevailing situation in Indian wind industry in earlier portion of this literature and therefore it is recommended that a project like Windskill may be started in India for the benefit of the industry. In the present time, India is enjoying demographic dividend. A large pool of future work force is young, they can be trained quickly and effectively and made wind industry ready. Industrial training institutes, technical diploma schools and colleges can play a big role and can rigorously work to develop the “qualification standard for manufacturing skills in the wind energy sector.”

In India, “Introduction to Wind Energy” has been a course for decades. It gives a general overview of the technology. Going beyond this, further specialized focused curriculum has may be prepared. Wind Turbine is to be considered as a heavy machine, which is made following the “aggregate assembly” principle of Operation Management. Therefore, curriculum can be designed accordingly focusing on (i) scientific plant layout,(ii) minimizing material handling, (iii) better usage of modern tools and tackles, (iv) enhanced focus on work safety etc.

Furthermore, coming out of the conventional “aggregate assembly” method, wind industry can borrow line assembly principle from auto industry and apply the principle to improve productivity and quality. Institutes may join hands to carry out some research and prepare modern course materials for the curriculum.

Next to the standard lectures, guest speakers can be invited from Industry. Representatives of renowned wind turbine manufacturers can also join hands to give the students the real-life background to the theory they are learning. So on and so forth.
Conclusion

I believe that with these two prong learning and development, market will surely come up with increased number of availability of trained and prepared work force. It will also result in availability of sufficient trained work force within the organization to work with enhanced productivity, and better performance culture. In turn it will pave the way for wind turbine manufacturing industry a successful journey to future.

References:

5. Dr. Ir. Tempel J., Dr. Brussel G. Training Future Professionals.