EVALUATION AND INVESTIGATION OF BEHAVIOUR BASED SAFETY IN ELECTRONIC MANUFACTURING INDUSTRY

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ABSTRACT

Enforcement of law and perpetration of different styles and practices by association to reduce accidents at plant is a continuum which has redounded in noways.Grounded Safety(BBS) study is a process that creates a safety cooperation between operation and workers that continually focuses people's amenities and actions on theirs, and others, diurnal safety actions. Safety performance was also estimated at regular intervals to calculate the enhancement in the group. The result showed that an acceptable enhancement in safety performance is possible with this approach. Behaviour-Grounded Safety(BBS) is a popular approach to enhancing occupational safety, with numerous experimenters reporting successes of enforcing BBS programs. There are, still, studies that see this approach as illusory, bringing further detriment than good. The first thing of this composition is to present an overview of literature furnishing both substantiation and elaboration of enforcing BBS programs, pressing both positive and negative views of the approach. The alternate thing is to bandy the perception of the system, grounded on a literature review and authors enjoy exploration.BBS programmes frequently include regular monitoring of employee conduct, coaching and feedback, and the application of safety standards and procedures. The majority of the time, observations are made by qualified safety observers who carefully watch employees while they execute their duties and offer feedback based on preset safety criteria. Feedback is often offered in a non-punitive way, emphasising the reinforcement of positive behaviours and highlighting areas for improvement.The core tenet of BBS is that by constructively reinforcing safe behaviours and addressing hazardous behaviours with coaching and feedback, employees can create safer habitudes and enhance their overall performance in terms of safety. Additionally, BBS programmes place a strong emphasis on employee involvement and engagement in the safety process, empowering workers to take responsibility for their own safety as well as the safety of their coworkers.

Key Words : *Safe behaviour, unsafe behaviour, Implementation,Unsafe Behaviour data,Risk, Hierarchy of control*

1. INTRODUCTION

The Company;

Through creative and effective Electronic System Design and Manufacturing over the past 40 years, Syrma SGS has become the preferred value creator for its clients. They offer precise OEM manufacturing with a high mix of volume and flexibility. Electronics manufacturing services (EMS), which we offer as a one-stop shop, also include services for product design, rapid prototyping, PCB assembly, Blox construction, repair & rework, and automation tester creation. Additionally, Syrma SGS provides OEM options for high-frequency magnetic components as well as RFID tags and inlays. We have supplied numerous hundreds of millions of units to global OEMs in more than 20 countries.

Fig.1 Manufacturing unit

2. DESCRIPTION OF THE WORKPLACE AND ITS ACTIVITIES

2.1 DESCRIPTION OF WORKPLACE:

The current workplace consists of an Incoming inspection, winding, trimming, tinning, chip soldering, frequency checking, potting, curing, over molding, frequency checking, visual inspection, final goods. In each every process are man dependent and there are more unsafe behaviours and risk associated with occupational hazard. The major process are explained below

2.2 COIL WINDING:

Copper wire is wound as per procedure by tanac table top winding machine or Nippon serbig winder. In this process operator use locitite chemical for the bonding the core and coil. Its hazards to eye and the PPE of goggles and Overcoat wearing to protect from the process.

2.3 LEAD TINNING

The trimmed leads are then tinned by using soldering iron or by solder pot with the lead-free solder wire. In this tinning the operators are working in the temperature of 400℃ along with flux.

2.4 EPOXY POTTING

The transponder is placed in PP base and epoxy is poured in to the base. The potted transponder is allowed to cure in the oven for minimum of 8 hours with 85 degree celcius. During potting process used cotton wipers, hand gloves used epoxy, empty containers stored in Hazardous waste storage area and disposed to authorized recycler.

2.5 OVER MOLDING

Potted coil are overmolded by Injection moulding machine.During the over moulding the plastic waste generated and it disposed to authorized recycler.
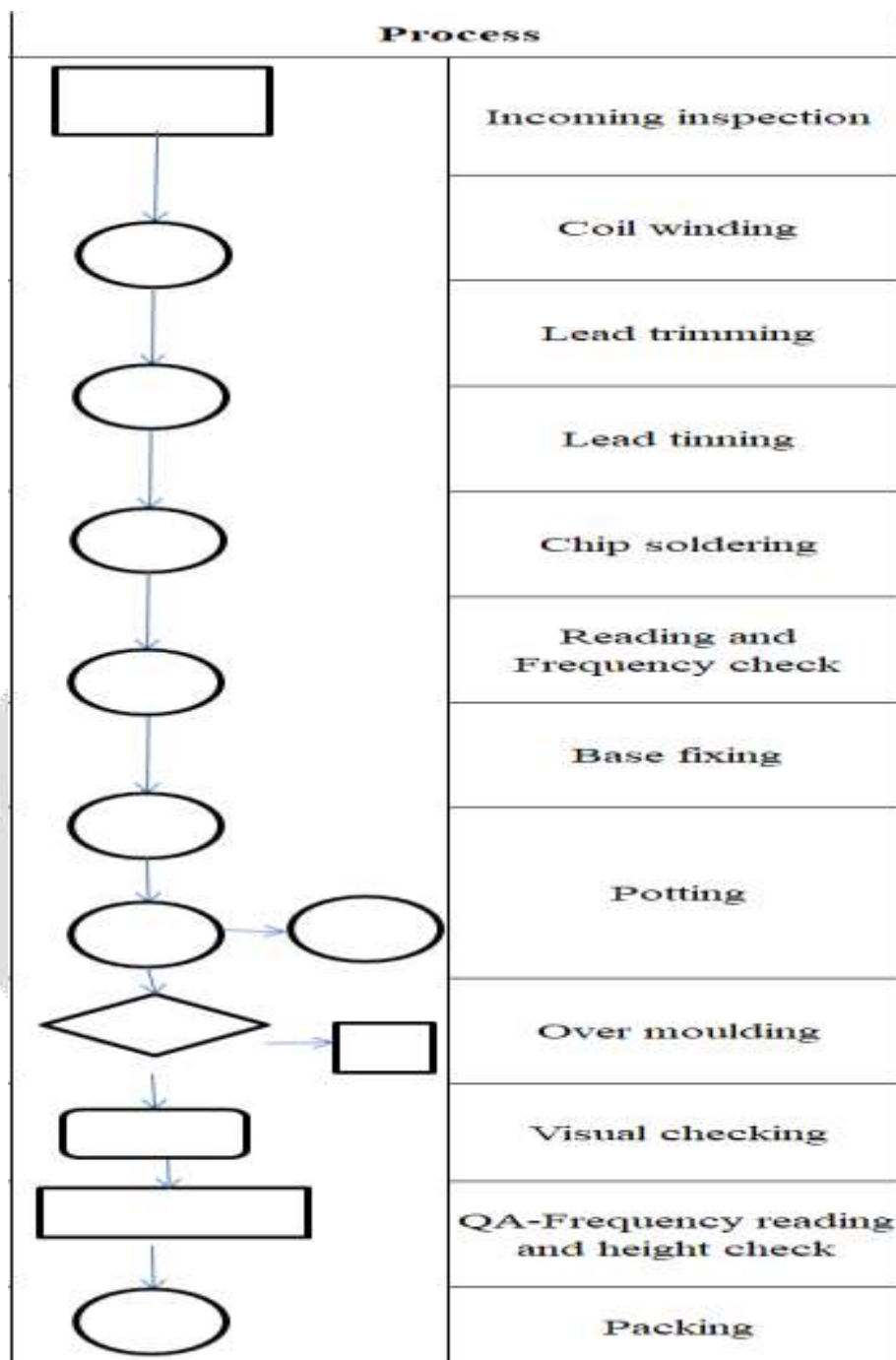
Fig-2 Process Flow chart

3. IDENTIFICATION OF OCCUPATIONAL UNSAFE BEHAVIOURS.

Manufacturing : In examining the literature on unsafe behavior in the manufacturing job sector, factors such as acceptance of risk, non-compliance with work procedures, risky behavior of co-workers, stress and pressure to meet deadlines were mostly observed Workers might sacrifce safety to meet deadlines, thus leading to severe injuries. Furthermore, a poor work environment due to excessive noise levels, exposure to fumes and dust and poorly maintained equipment were contributory factors to unsafe behavior. Unsafe work behavior in the manufacturing context also resulted in both physical and psychological injuries. Measures such as frequent training are proposed to help reduce risk behaviors among workers. In addition, manufacturer training programs relating to equipment use and application should be designed to motivate workers to report unsafe work conditions. Moreover, management should provide regular maintenance of machines and equipment, as well as making relevant safety information visible . Furthermore, expression of concern for the overall health of workers could potentially lead to positive relationships among them and reduce work pressure. These solutions can help eliminate most of the triggers of unsafe worker behavior in this context.

WINDING

The unsafe behavior in the winding process was found are Working without the goggles and gloves and overcoat during their work. It causes a serious health hazard.

POTTING

In the Epoxy potting the coil to be potted with chemicals of resin and hardener to free from the defects and the after the potting the coil is kept in the oven for the curing purpose. In this process the unsafe behaviors of handling of chemicals without the proper PPE's.

TINNING

The Tinning process the operator working in the tinning pot with a temperature of 400 degree Celsius with a chemical of flux and lead free solder. In this process they working without the gloves and goggles for the specific process.

OVER MOLDING

The product was completed on the semi stage and it enters into the Overmoulding process in the process the coils are loaded into the machine and the coils which is over molded with PPS material and the coil automatically get out from the machine. The opertors were working with this are not wearing the heat resistant gloves during the loading of coils.

EXAMPLES OF UNSAFE BEHAVIORS IN THE UNIT

Fig 3 Working in the unsafe manner

Fig 4 Handling the chemicals in unsafe

4. IMPLEMENTATION OF THE BBS IN REDUCING THE UNSAFE BEHAVIOURS

The final step in implementing BBS is to roll out the interventions and evaluate their effectiveness. This involves monitoring progress, collecting feedback, and making adjustments as needed to ensure the success of the program. The sequence of the implementation as follows
Leadership commitment
Employee involvement
Behavior identification
Data analysis
Intervention development
Implementation and Evaluation

4.1 TRAINING

Behaviour based safety training is a form of employee safety education that focuses on preventing workplace accidents and injuries through teaching employees to think, behave and make decisions in safe ways. It follows the understanding that most workplace accidents are caused by people not following known best practices or engaging in risky behaviour due to lack of knowledge or awareness. The goal of this type of employee training is to equip workers with an improved attitude towards safety, as well as increased knowledge about common hazards found in their work environment and necessary prevention methods, ultimately reducing errors that can lead to potential harm for themselves or others. This style of training often involves interactive sessions with role-playing scenarios focused on identifying hazardous situations before they potentially become problems at the workplace.
 There are a few types of training are
Induction training
Job specific training.
Induction training is the first stage of a new employee's learning process. It typically occurs when they start their job and involves programs such as safety explanations, workplace orientation and introductions to other staff members. On the other hand, job-specific training focuses on giving an individual specific instructions or guidance related to their role in the company; for example, managing customer service inquiries effectively so that customers have a positive experience with your business. Both induction and job-specific training are important parts of preparing employees for their roles within an organization.

Fig 5 Job Specific Training

The frequency of induction and job specific training are initiated and conducted accordingly to the specific group of peoples to improve the BBS awareness.

Fig 6 Attendance sheet

4.2 LEADERSHIP COMMITMENT

Leadership commitment to and support of behavior-based safety training is essential for its successful implementation in any industry. Effective leaders need to set the tone, demonstrate their acceptance and understanding of the program's purpose, visible communicate their expectations throughout the organization, encourage engagement from all levels of employees, follow up on progress regularly, provide necessary resources and express appreciation when goals are achieved or exceeded. Without such high-level involvement in this process – especially during early phases as it's implemented across an organization – organizations may find that key personnel become disengaged or overly focused solely on meeting program goals rather than developing a long-term culture of safe behaviors among staff members. Ultimately, investing ample time and energy into establishing effective leadership practices related to operational safety can save considerable time, effort (and money!) over time by improving workplace safety outcomes while ultimately providing greater job satisfaction among team members.

Fig 7 Awareness training on unsafe behaviour

4.3 WORK ENVIRONMENT

Work environment in industry can be a very important factor for both employers and employees. A positive work atmosphere with good team dynamics, clear communication channels, an effective leadership style, job satisfaction, and skill sets that match the tasks of the industry are all key elements of a successful workplace. Additionally, how well an organization rewards its members' hardworking efforts should also not be overlooked as it helps to motivate employees and make them feel appreciated. Moreover, forming programs specific to developing each individual employee's skillset will ensure that everyone is equipped to perform at their highest level when needed by the company or any other stakeholders involved in the same sector. Creating various recreational activities within an office space could further benefit both workers' attitudes towards productivity while still allowing room for social interaction amongst one another which would lead to higher levels of overall engagement within the workforce creating value-adding prospects.The work environment in any industry depends largely on the culture and values of the organization. Generally, employees should expect to experience a supportive, collaborative atmosphere that encourages innovation and growth. Creativity is often highly valued in such environments, as it allows organizations to stay ahead of their competitors. The best businesses will also prioritize an Employee-First approach where employees are given ownership over their projects and allowed to express themselves openly. Such businesses promote trust between all members of staff allowing them to focus on problem solving while still respecting individual differences within the team dynamics. Additionally, respect for diversity should be consistently maintained ensuring equal rights among all workers regardless of age, gender or race/ethnicity so everyone feels welcome at work enabling personal development opportunities which lead teams towards success in their respective fields.

Fig 8 Automated Over molding Machine

The work environment of above mentioned like changing the automation of material sucking and no unsafe behavior will happen it reduce the accidents and near miss and injury and the work environment to be improved with a proper equipped facility to work flawlessly to avoid the unsafe behaviours.
In this machine and work environment will plays a major role reducing the injury. The infrastructure to be developed as per the requirement.

4.4 MACHINE ENVIRONMENT

Machine environment in industry is a concept that refers to the tools, materials, machines and processes used for industrial production. It includes things such as automation solutions, robotics technology, computer-aided design software programs and additive manufacturing systems which are all critical components of modern industrial operations. Further aspects can include data collection units, process optimization strategies and analytics approaches that allow businesses to achieve higher levels of efficiency while improving overall quality control measures. With many advancements being made within the field in recent years it has become more important than ever before for companies to focus on making sure they have access to up-to-date machine environments which will enhance workflow performance and yield greater product output whilst keeping costs low.

5. RESULTS IN THE MANUFACTURING UNIT

Fig 9   Regular Training (Job Specific)

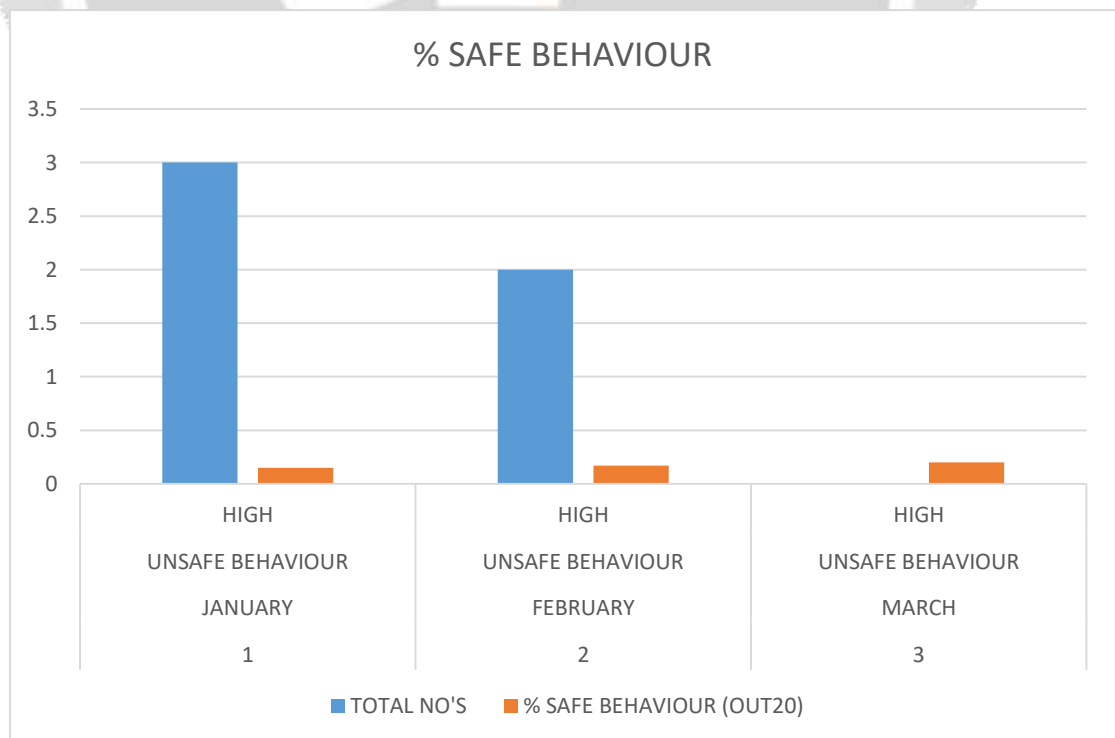**Fig 10** Using the Proper PPE's (winding)

Fig 11 Using the Proper PPE's (Potting)

Fig 12 Using the Proper PPE's (Tinning)

6.DATA ANALYSIS

TABLE 1 BEHAVIOURAL DATA

S.NO	MONTH	DESCRIPTION	RISK	TOTAL NO'S	% SAFE BEHAVIOUR (OUT20)
1	JANUARY	UNSAFE BEHAVIOUR	HIGH	3	15%
2	FEBRUARY	UNSAFE BEHAVIOUR	HIGH	2	17%
3	MARCH	UNSAFE BEHAVIOUR	HIGH	0	20%

7. CONCLUSION

The concept and process of BBS can bring for safety professionals and everyone who are concerned about correcting unsafe behaviors for reduction of accidents and promoting safe behavior's for developing injury free culture in their organizations. Behavior-based safety training and implementation helps improve organizational safety culture. By increasing the quality and frequency of safety feedback in the organization, barriers between employees both within and across organizational levels are reduced. Improving safety communication (both correcting and rewarding feedback) through BBS leads to a more open, positive, and trusting safety culture as well as improved safety performance. BBS is a process that provides organizations the opportunity to move to a higher level of safety excellence by promoting proactive responding to leading indicators that are statistically valid, building ownership, trust, and unity across the team, and developing empowerment opportunities which relate to employee safety.

8. REFERENCES

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