

FESHM 7090: TECH SHOP SAFETY

Revision History

Author	Description of Change	Revision Date
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TABLE OF CONTENTS

1.0	INTRODUCTION.....	3
2.0	DEFINITIONS	3
3.0	RESPONSIBILITIES.....	4
3.1	Division/Section Head.....	4
3.2	ESH&Q Section	4
3.3	Machine Repair Group (APSTD Machine Shop Department).....	4
3.4	Tech Shop Point of Contact.....	4
3.5	Tech Shop Educator	5
3.6	Tech Shop Users.....	5
4.0	PROCEDURES.....	5
4.1	Training for Tech Shop Users	5
4.1.1.	Training Specifics	5
4.1.2.	Evaluation	6
4.1.3.	On the Job Training (OJT).....	6
4.2	Inspection and maintenance of shop equipment.....	6
4.2.1.	Inspection of Tech Shop equipment	6
4.2.2.	Maintenance of shop equipment.....	7
4.3	New or retired machining equipment	7
4.4	Record Keeping	7
4.5	Exemptions.....	7
5.0	REFERENCES.....	7

1.0 INTRODUCTION

This chapter applies to all machine equipment contained within Tech Shops located on the Fermilab Site in Batavia, Illinois. Equipment covered under this chapter includes but is not limited to; lathes, milling machines, drill presses, band saws, grinders, powered sanders, chop saws, and other mechanically operated tools such as breaks, punches and shears. This chapter does not cover Machine Shops that are operated by bargaining unit employees. Machine Shops have their own policy(ies) located here: <http://www-tdserver1.fnal.gov/tdweb/ms/Policies>. In addition, the bargaining unit Machinists have gone through extensive training and skills qualifications to be considered for employment at Fermilab, therefore they are excluded from the training requirements set forth in this chapter. Safe operation and use of Tech Shop equipment in Fermilab leased spaces that is Fermilab equipment being used by Fermilab employees falls under the jurisdiction of this chapter.

To reduce the risk of personal injury, adverse environmental impact, and damage to equipment, Fermilab has established controls for the use of the machines in our Tech Shops. Personnel must be authorized in accordance with this procedure, prior to use of Tech Shop equipment. Working in a Tech Shop without successful completion of either or both the courses, and approval from the shop Point of Contact could result in disciplinary action.

There are also several options to obtain machining services as an alternative to becoming a qualified Tech Shop User. A full line of machining services is available through the FNAL Machine Shops, where items are machined to specific and exact tolerances and precision by the Applied Physics & Superconducting Technology Division (APSTD) bargaining unit Machinists. Or, one can ask Division/Section (D/S) management to use the resources of authorized Tech Shop Users to machine items requiring a lower tolerance and precision.

2.0 DEFINITIONS

Machine Equipment: Stationary, as opposed to hand-held, material forming tools.

Machine Shop: Machine shop is a Fermilab term for shops that contain equipment under the control of APSTD trained machinists.

Tech Shop: Any location where machine tools are available to personnel. Tech Shop is a Fermilab term for shops under division control and open to trained and authorized division/section personnel and Division Safety Officer (DSO) authorized Fermilab User's.

Tech Shop Educator: A person knowledgeable of machine tool operation/training and appointed by the lab to determine via classroom training, hands-on demonstration and/or written tests, if a Tech Shop user candidate has sufficient experience and skills to use the machine(s) in a proper, safe manner.

Tech Shop Point of Contact (POC): Appointed by Division/Section management to represent/oversee Tech Shop operations and maintenance.

Tech Shop User: Any person who has successfully completed the training and uses machine equipment in a Tech Shop.

Qualified Operator List: A list maintained via TRAIN that identifies individuals who have successfully completed one or both of the Tech Shop safety courses. This list must be referenced by the POC prior to allowing an individual permission to operate within their shop. A link to this list will be available on the Tech Shop Webpage and a refresher will be sent to the POC's every time a course has been completed.

3.0 RESPONSIBILITIES

3.1 Division/Section Head

- Assigning one or more individuals to be responsible for area Tech Shops (POC), based on the below listed criteria for POC duties.
- Assuring, through the line management, that employees assigned to operate machine equipment are trained and authorized to do so.
- Assuring, through line management, that, prior to procurement, any new metal-working machines be reviewed by the APSTD Machine Repair Group.
- Assuring, through line management, that annual inspections of the Tech Shop machines within the D/S are performed and documented.

3.2 ESH&Q Section

- Providing consultation services to division/section or department heads regarding safety of operations and training opportunities.
- Coordinating and scheduling training for newly selected and existing machine operators.
- Maintaining training records of Tech Shop machine operators.

3.3 Machine Repair Group (APSTD Machine Shop Department)

- Approval of equipment and initial inspection of equipment installed in D/S technical areas.
- Providing services requested by the division for repair or maintenance of shop equipment.

3.4 Tech Shop Point of Contact

The Tech Shop Point of Contact, who may also serve as the Supervisor, Area Manager or Building Manager (depending upon divisional roles):

- Has the authority to deny anyone access to their shop regardless of their experience or training history.
- Periodically performs a walkthrough of the shop under their responsibility to inspect for equipment condition, ensure guards are in place and in good condition, ensure good housekeeping, etc.
- Ensures that documentation on machine equipment, including the manufacturer's safety and operation instructions, are made readily available to shop users in the Tech Shop where the equipment is located. If the exact manual cannot be located, the Tech Shop POC must diligently research an equivalent manual and submit it to the APSTD Machine Shop Supervisor. It is up to the APSTD Machine Shop Supervisor to approve "like" manuals for the equipment if the manual for that exact machine is not available.
- Ensures the individual requesting access to their shop has completed the appropriate Tech Shop Safety course.

- Controls access to the machines via locked doors (either building or Tech Shop), keypad or card reader access, administrative locks, or posted as “Approved Personnel Only” are a few examples.
- Ensures all safety signage is available and posted within the shop.
- Contacts Machine Repair when issues are discovered with the equipment.
- Applies configuration control locks or tags to machinery that is not operating properly or is unsafe.
- Performs annual inspections of the Tech Shop machines.
- Has completed Tech Shop Training and Tech Shop POC training.

3.5 Tech Shop Educator

The Tech Shop Educator is an offsite vendor and is responsible for:

- Administering a classroom portion in accordance with this FESHM chapter, and evaluating hands on performance to assess if a candidate has the ability to use specific machine tools in a proper, safe manner. The assessment of candidates will be on a core group of machines and the outcome of the evaluation will be based on the individual portraying the aspects taught in the classroom portion of the training course(s). Individuals will either be deemed as “Passing”, or will require further On the Job Training (OJT) with supervision or shadowing from a qualified individual.
- Documenting the assessment of candidates and providing the records to the ESH&Q Section Training Group.

3.6 Tech Shop Users

- Successful completion of either, or both of the Tech Shop Safety Courses.
- Requesting access for use of Tech Shops from the Tech Shop POC.
- Ensuring they are properly trained for the equipment they will be using.
- Contacting their supervisor if they feel they are not trained or comfortable with the work assigned.
- Being familiar with the piece of equipment through reading the operators manual and training.
- Following pre-operational setup as instructed in the training course(s). If any issues arise, contact shop POC or consult equipment manual.
- Notifying the Supervisor/Tech Shop POC/Area Manager/Building Manager/DSO when deficiencies in guarding, electrical/energy source issues, housekeeping, etc. are found.
- Operating the machines within the Tech Shop in a safe and appropriate manner.
- Practicing good housekeeping when completed with the job.

4.0 PROCEDURES

4.1 Training for Tech Shop Users

4.1.1. Training Specifics

Operators must be trained on the safe working practices for each machine they are expected to operate. The training offered through Fermilab is a vendor provided safety training course that teaches safe behavior and operation within a Tech Shop, as well as offering a hands-on portion to allow individuals to get basic experience on a group of machines. The

training of individuals on each machine they will be expected to use is the shared responsibility of the individual's supervisor and Tech Shop POC. Only through shadowing and approval from the Tech Shop POC, can an individual be authorized to operate machines within a Tech Shop alone.

Training is a one-time course and consists of Tech Shop Safety Training Basic FN000258/CR, and/or Tech Shop Safety Training Mill & Lathe FN000576/CR along with an evaluation of the employee in a Tech Shop setting on equipment similar to what they will be using in their shop(s). An individual does not need to take both courses to be able to work in a Tech Shop, they may need to only take one, depending upon the equipment they are expected to use. The ITNA will guide the supervisor to the appropriate courses. Additional training on machines not included in the Tech Shop Training catalog can be requested through the training group at the discretion of the individuals Tech Shop POC or supervisor. Individuals who have previously had this new training course, with the hands-on portion prior to the issuance of this FESHM chapter, will be sent the updated Tech Shop Safety Training (FN000258 and/or FN000576) associated power point presentation from the class, along with the refresher quiz. This will serve as the current training qualification for that individual in lieu of having to take the full course again.

4.1.2. Evaluation

The evaluation will consist of an observation by the Tech Shop Educator of the operator on a core group of equipment similar to those they are expected to use. The evaluation will discuss typical materials, tooling and guarding for the expected operations and limitations on the types and dimensions of materials to be worked on those machines. Once the evaluation is complete, the operator will sign off on the evaluation form in conjunction with the Tech Shop Educator. [Basic Evaluation Form](#) and the [Mill & Lathe Evaluation form](#). This evaluation is to be sent to the Training group to be kept in the employee's file. A copy of this form **MUST** be taken by the employee to their supervisor to convey the outcome of the training and initiate their next steps in Tech Shop machine operation.

4.1.3. On the Job Training (OJT)

The OJT portion of the program can be initiated in multiple ways. If the Tech Shop Educator deems a Tech Shop Training attendee's skill unsatisfactory to the extent where he/she can only perform supervised work on the machines with a qualified individual, that will trigger OJT. Secondly, if the individual feels that they would benefit from further OJT until they are comfortable operating alone, they are free to request that. An OJT schedule will be determined by the employee's supervisor and/or Tech Shop POC on a case by case basis depending on the individual's skill level. Re-taking of the Tech Shop Evaluation is necessary once OJT has been completed in the instance of the Educator initiated OJT to display proficiency to the instructor and to track the progress in TRAIN.

4.2 Inspection and maintenance of shop equipment

4.2.1. Inspection of Tech Shop equipment

Shop equipment shall be inspected prior to use for integrity, operational guarding, proper positioning of guarding, general housekeeping around the work area, and any other operational functionality of the equipment. The pre-operational check shall identify any

deficiencies. If deficiencies are identified, the machine shall be locked and tagged out with a configuration control lock and tag. The deficiencies should be communicated to the Tech Shop user's supervisor or APSTD Machine Repair Group, the Tech Shop Point of Contact (if applicable) and/or the area/building manager. Annual inspections must be performed and documented to evaluate safety/operability/functionality of all machines within a shop.

4.2.2. Maintenance of shop equipment

Shop equipment shall be maintained per manufacturer specifications. D/S can utilize APSTD's Machine Repair Group to perform inspections, preventative maintenance and repair of Fermilab-owned shop equipment.

4.3 New or retired machining equipment

All purchase requisitions for metal-working machinery must be reviewed and approved by the APSTD Machine Shop Superintendent. After the equipment has arrived onsite, the APSTD's Machine Shop Superintendent should be contacted to inspect/commission the equipment and enter it into their inventory prior to startup. When equipment is retired, contact Machine Repair to have the equipment removed from the machine maintenance inventory. The property custodian for the piece of equipment can excess the equipment once removed from inventory.

4.4 Record Keeping

The ESH&Q Section will maintain all training records. Divisions/Sections may retain copies but the original completed training and evaluation forms will be forwarded to ESH&Q Section.

4.5 Exemptions

There are exemptions to the classroom portion of the courses. Vehicle Maintenance Mechanics, and Carpenters work with specialized machines in their respective shops. Machine specific procedures, an HA or manufacturer provided training is acceptable in lieu of the classroom portion, however, procedures or HA's must be signed by all operators, and manufacturer training must be documented with a Fermilab training attendance sheet for the evaluation portion of the Tech Shop program and submitted to the ESH&Q training group. Operators within these shops need to be informed of the requirements of this chapter and ensure that their shops are compliant, and therefore will be required to review the presentation from the classroom portion and take a short quiz. The machines in these shops are not exempt from the requirements of this chapter as they require proper guarding, safety stops (if equipped), knowledge and understanding of proper operation, availability of manuals, etc.

Summer students over the age of 18 are allowed to operate under the guidelines of an HA or procedure, granted that they are shadowed by an approved Tech Shop operator, and that their use of machines is infrequent. Frequent use by a summer student will require the attendance of one of the Tech Shop safety courses.

5.0 REFERENCES

OSHA 1910.212 (Subpart O) – Machinery and Machine Guarding
NFPA 79 – Electrical Standard for Industrial Machinery
ANSI B11 Series – Machinery Safety Standards