





Collaborative Bachelor's Degree Program of Fire Protection and Safety  
Engineering Technology between Southwest Jiaotong University and  
Oklahoma State University, U.S.A.



---

## FPST 2023 Industrial and Occupational Safety

Machine Guarding – Part 2

1

---

---


---

---


---

---

---



Adjustable Guards



---

- Characteristics
  - Allows flexibility in accommodating various sizes of stock
- Safeguarding action
  - Provides a barrier that may be adjusted to work with a variety of production operations

2

---

---


---

---


---

---

---



Adjustable Guards



---

- Advantages
  - Can be constructed to suit many specific applications
  - Can be adjusted to admit varying sizes of stock
- Limitations
  - Hands may enter danger area - protection may not be complete at all times
  - Frequent adjustment not done
  - The guard may be made ineffective by the operator
  - May interfere with visibility

3

---

---

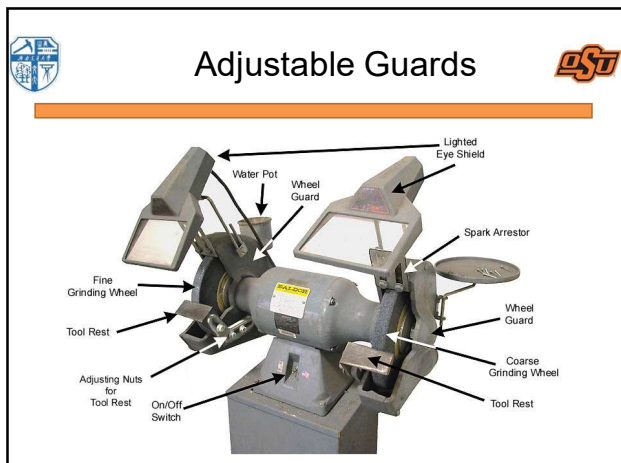
---

---

---

---

---



4

---

---

---

---

---

---

---

---



5

---

---

---

---

---

---

---

---



6

---

---

---

---

---

---

---

---



## Self-adjusting Guards



- Characteristics
  - Guard opens and closes to admit stock
- Safeguarding action
  - Provides a barrier that moves according to the size of the stock entering the danger area

7

---

---

---

---

---

---

---



## Self-adjusting Guards



- Advantages
  - Off-the-shelf guards are often commercially available
- Limitations
  - Does not always provide maximum protection
  - May interfere with visibility
  - May require frequent maintenance and adjustment

8

---

---

---

---

---

---

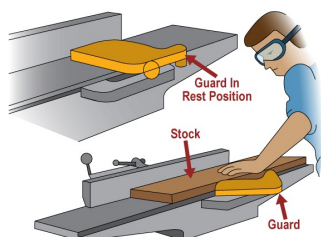
---



## Self-adjusting Guards



### Self-Adjusting Guard On Jointer



OSHAcademy  
Occupational Safety & Health Training

www.oshaacademy.org © 2018, OSHA Academy

9

---

---

---

---

---

---

---



## Self-adjusting Guards



10

---

---

---

---

---

---

---

---



11

---

---

---

---

---

---

---

---



12

---

---

---

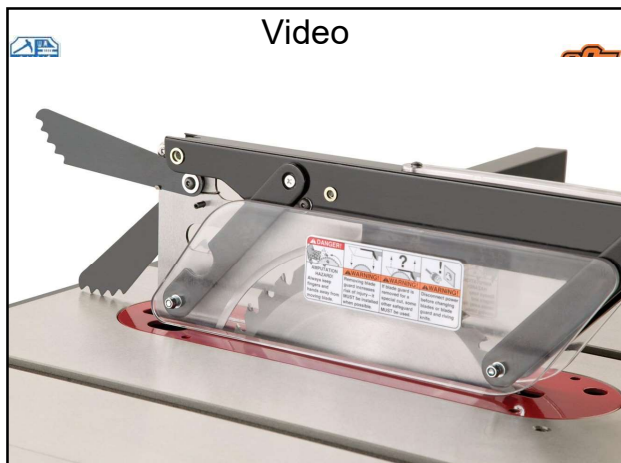
---

---

---

---

---



13

---

---

---

---

---

---

---

Presence-sensing

- Characteristics
  - Permanent part of the machine
  - Uses light or mats to detect presence of person
- Safeguarding action
  - Senses operator is near danger area and shuts off machine
  - Stops machine before worker can reach the danger area

14

---

---

---

---

---

---

---

Presence-sensing

15

---

---

---


---

---


---



---





### Presence-sensing





16

---

---

---


---

---


---


---

---



### Presence-sensing





17

---

---

---


---

---


---


---

---



### Presence-sensing





18

---

---

---

---


---

---


---


---





## Presence-sensing





19

---

---


---

---


---

---

---



## Other Safeguards



- Pullback devices
  - A series of cables are attached to the operator's hands, wrists, or arms
  - As the machine begins to cycle, the operator's hands are pulled out of the danger area
- Restraint devices
  - Cables are attached to operator
  - Prevents operator from reaching into the danger area Operator must use hand-feeding tools

20

---

---

---

---

---

---

---





21

---

---

---

---

---

---

---





## Other Safeguards



- Two-hand control
  - Requires operator to use both hands on separate controls
  - Prevents hands from being in the danger area when machine cycle states

---

---

---

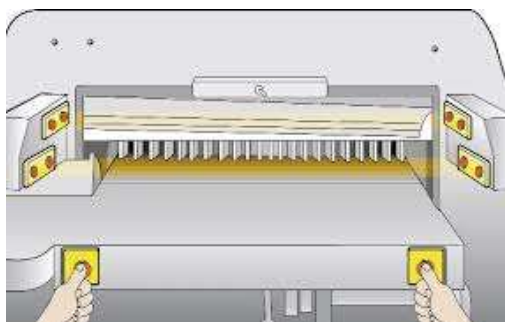
---

---

---

---

22



---

---

---

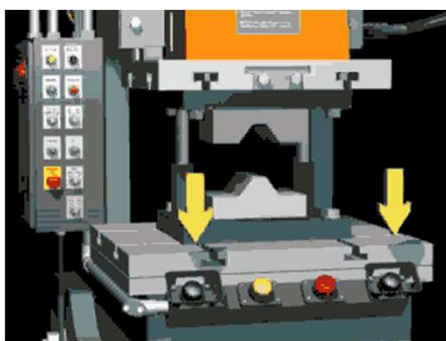
---

---

---

---

23



---

---

---

---

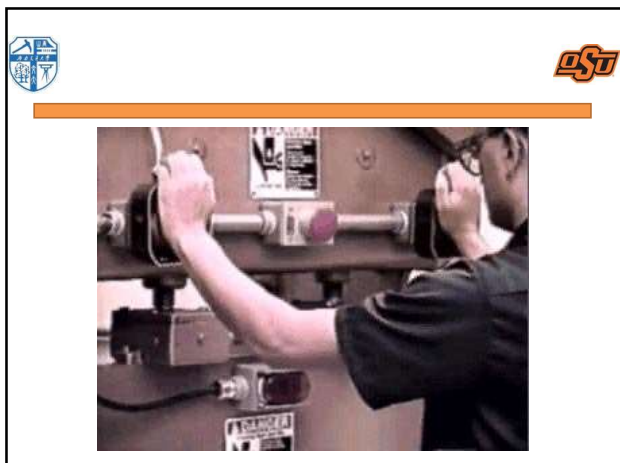
---

---

---

24





25

---

---

---

---

---

---

---



26

---

---

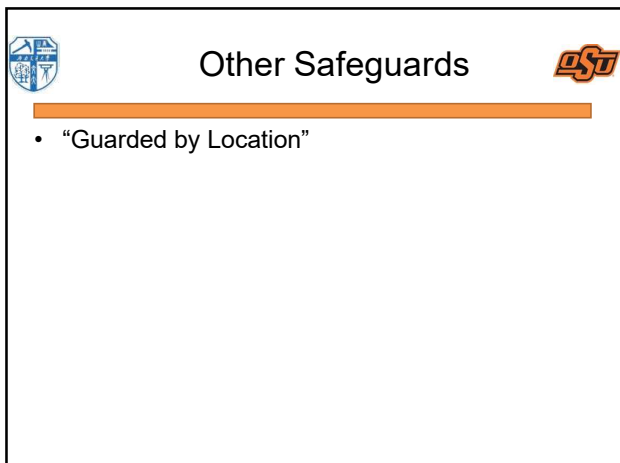
---

---

---

---

---



27

---

---

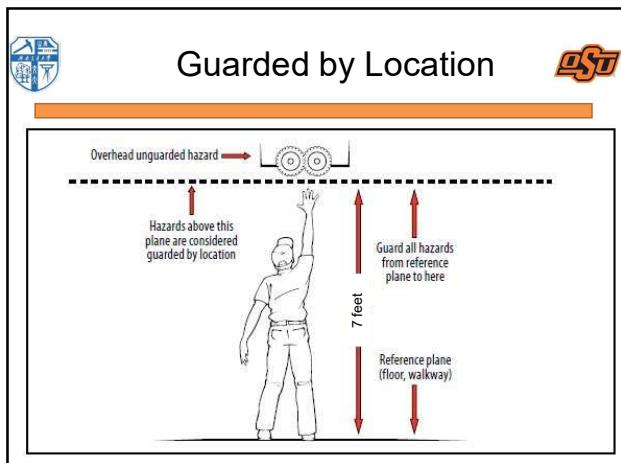
---

---

---

---

---



28

---

---

---

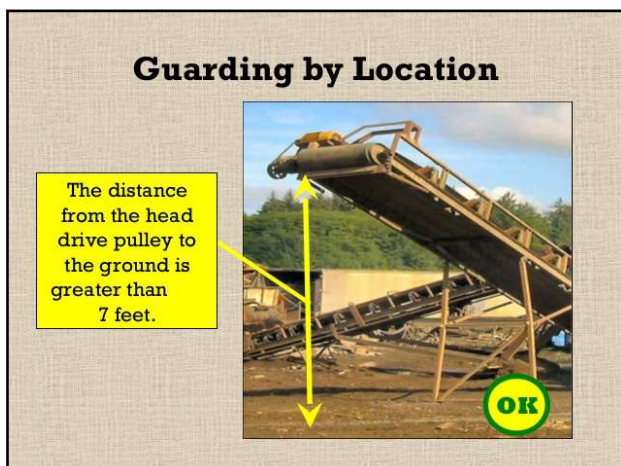
---

---

---

---

---



29

---

---

---

---

---

---

---

---



30

---

---

---

---

---

---

---

---



31

---

---

---

---

---

---

---



32

---

---

---

---

---

---

---



33

---

---

---

---

---

---

---



34

---

---

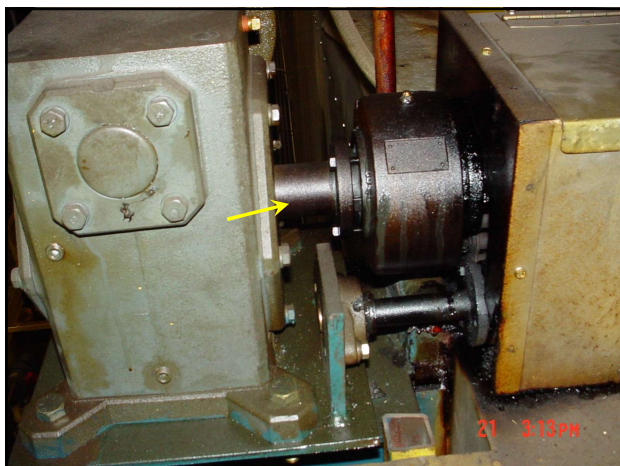
---

---

---

---

---



35

---

---

---

---

---

---

---



36

---

---

---

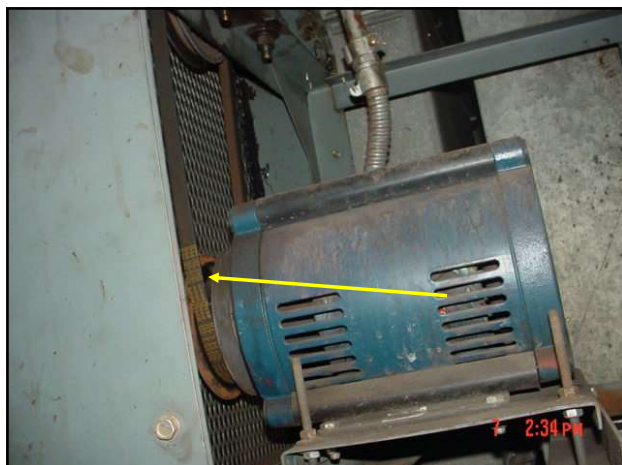
---

---

---

---





37

---

---

---

---

---

---

---



38

---

---

---

---

---

---

---



39

---

---

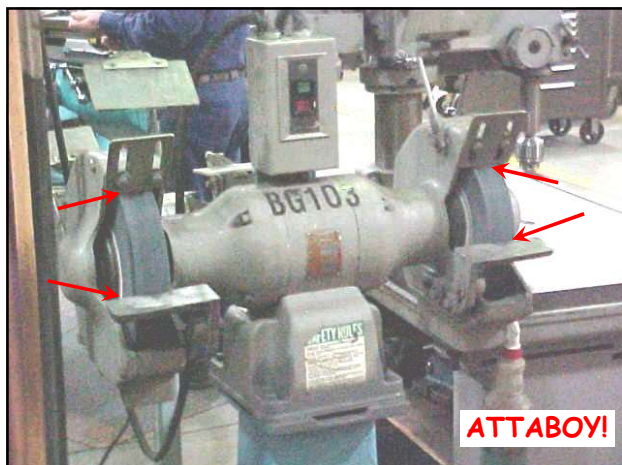
---

---

---

---

---



40

---

---

---

---

---

---

---



41

---

---

---

---

---

---

---



42

---

---

---

---

---

---

---



43

---

---

---

---

---

---

---



44

---

---

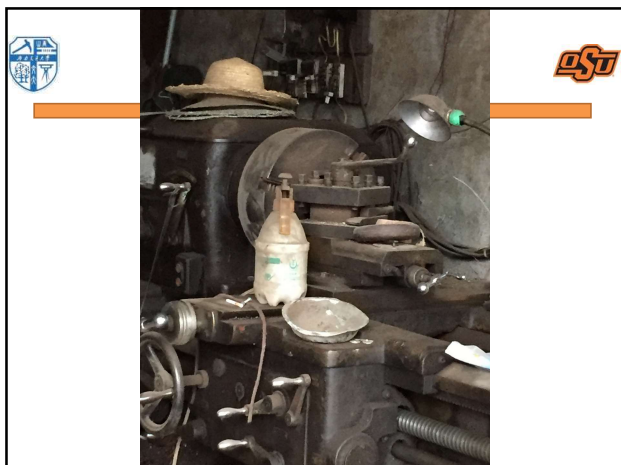
---

---

---

---

---



45

---

---

---

---

---

---

---





46

---

---

---

---

---

---

---



47

---

---

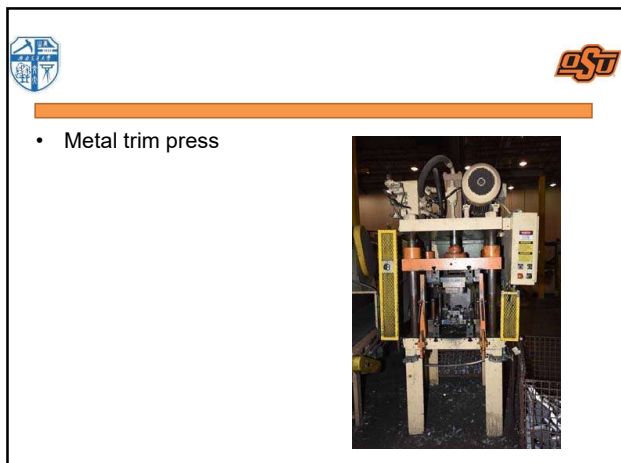
---

---

---

---

---



48

---

---

---

---

---

---

---



49

---

---

---

---

---

---

---



50

---

---


---

---


---

---

---




## Summary



---

- Humans vs. moving equipment
  - Humans lose
- If it moves, guard it
- If you have to work on it – LOTO



---

---

---

---

---

---

---

51