

**MAE 594: Robotics II**  
**Assignment - System Design Through Task Analysis Lab**

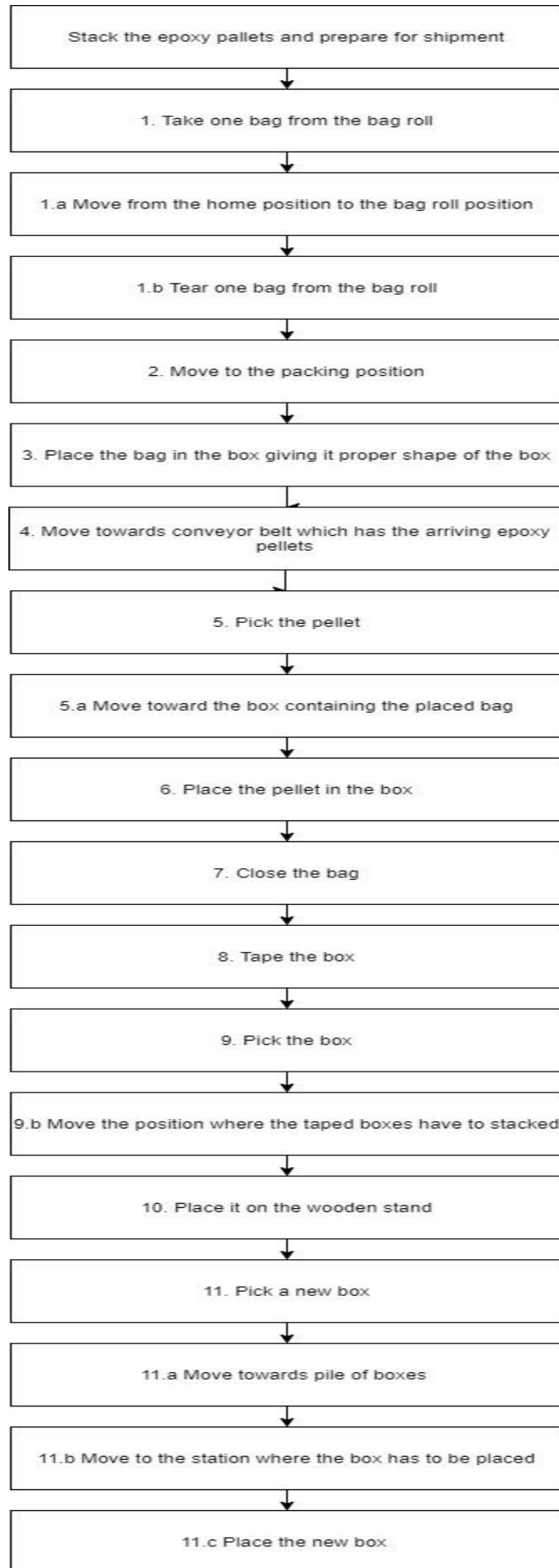
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**Task Analysis:**

1. On analysis of the video, we can deduce that the worker has a bad posture while performing his task after moving towards the conveyor belt wherein he picks the epoxy pellets and places these pellets in the box.
2. Also, a lot of time is invested by the worker to pick up each pellet from the conveyor belt to place it in the box.
3. Thus, while executing the task of picking up the pellets the worker has to bend down each time he has to lift a new pellet and again bend to place it in the box.
4. Also, after the shipment box has been taped the worker has to lift the heavy box and move towards the station where these boxes have to be placed.

The task analysis of the entire process in the video is described in the form of a flowchart:



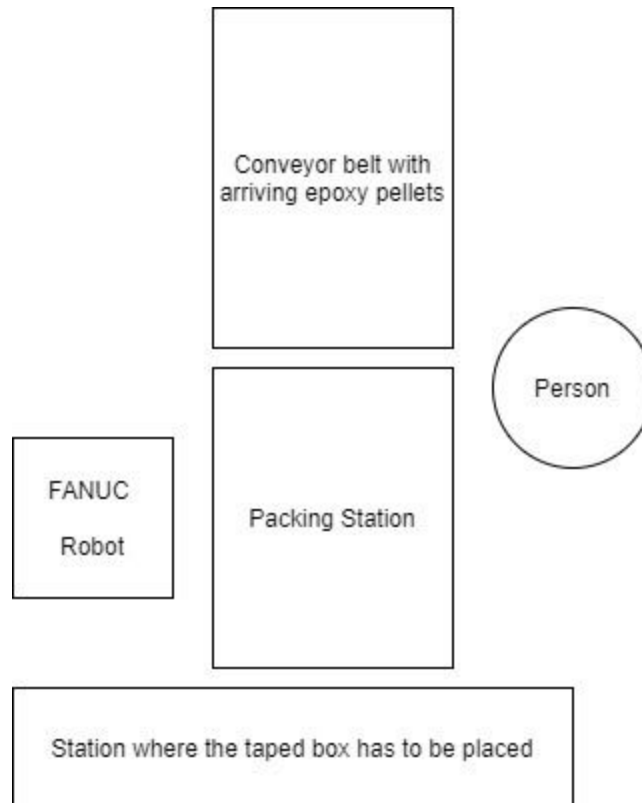
### Function Allocation:

<u>TASK TO BE PERFORMED</u>	<u>OPERATOR AND REASON</u>
1. Tear one bag from the bag roll	Human : Since it is easy to perform.
2. Place the bag in the box giving it proper shape	Human : Since it is easy to perform.
3. Move towards conveyor belt which has the arriving epoxy pellets	Robot : Since time is unnecessarily wasted
4. Pick up the pellet	Robot : Since the worker has to constantly bend down to pick up the pellet
5. Move toward the box containing the placed bag	Robot : Since time is unnecessarily wasted
6. Place the pellet in the box	Robot : Since the worker has to constantly bend down to place the pellet
7. Close the bag and tape the box	Human : Since it is easy to perform.
8. Pick up the box	Robot : Since the worker has to lift the heavy box
9. Move to the station where the box has to be placed	Robot : Since time is unnecessarily wasted
10. Place the new box	Robot : Since the worker has to constantly bend down to place the box

### Workstation Design:

The ergonomic concerns with the current workstation design are that due to placement of packing stations at a lower level than the worker, he has to constantly bend to pick up each pellet from the conveyor belt and to place them in the box. This has a bad impact on his posture. Thus, this can significantly hamper his health in the long run. Also, he places each pellet at one time, it involves a lot of time to

be invested which can in turn lower the productivity of the company cumulatively on a daily basis. Thus, it can prove to hamper company progress all together. Also, after the shipment box has been taped, the worker has to lift this heavy box and place it on the other station. Since, this process again involves bending to lift the heavy weight and again bend to place it, it can impose serious health issues to the worker.



As per the alternative design provided above, the worker would tear one bag from the bag roll, place it inside the box giving it proper shape, then the robot would pick up each arriving pellet from the conveyor belt and place it in the box so as to ease the work of the worker. Further, the worker would close the bag and tape the box. After this, the robot would pick the taped box and place it on the wooden stand as it would reduce the task of the worker to bend and pick up the heavy box and then again bend to place it on the other station. Also, this would save the worker

from losing unnecessary time which would in turn increase the productivity of the company.