Abstract
As we know that workshop is heart of any industry. It consists of different machine by which work is performed. Lathe is an important part of any workshop so we have to consider its safety. Also we observe many accidents due to various reasons in w/s; one of major reason for accident is in regards with chuck key on chuck. Nearly about 1000 of accident happen per year due to this reason, so we decide to work on this problem. We made a design of a model to overcome this problem of accident. We took trials on it which is successful. Now accidents because of chuck can be completely controlled.
1. Introduction

It is impossible to produce any part of mechanical devices and other without workshop. Because we required various machines in order to shape the part. Workshop is consisting of different type of machines like Drilling, Milling and Lathe etc. also we know that the frequent accidents are also obvious during the operation and processing. There are so many reasons of accidents which lead to damage of the products as well as injury to the operator. We have concentrated on one of the major reason of accident on lathe that is chuck key.

Chuck key is used for tightening the job in chuck. It is obvious that due to lack of care even after the tightening of the job in chuck we keep chuck key on the chuck, we forget to remove the chuck key. So when we start the lathe because of motion chuck key gets thrown away from chuck and hits the operator then the accident will occurs this type of accident happens in workshop of collages where the students learn how to handle the machine. Even trainer or guide inform them about precautions, trainee forget it some time. Also many time operators’ puts chuck key on guide ways or anywhere else which may cause accident. Operator experiences fatigue for same. So, after considering all this things we have made some modification is the design of the switch by which we can prevent all these accidents.

Generally there is a switch to on /off the machine, which is operated using a lever operated knob. So we design a new knob such a way that the chuck key will fit into the knob & we replace the lever operated knob by the newly designed chuck key holder knob.

2. Severity Of Problem

I. There are much more chances of accidents, if chuck key remains on chuck and we start lathe then chuck key will get fly and hits to worker which causes severe accident.

II. If same hits to any machine part then that part may also get damaged which causes both money and time wastage.

III. If chuck key place on guide way and we operate the apron mechanism. The mechanism will get blocked which will causes wastage of time and also may causes damage to mechanism or guide way.

IV. As the place of chuck key is not standardized worker face difficulty to find it. Due to that the overall performance of worker may get hamper and hence productivity decreases. Overall the production hampers much more due to chuck key accidents.

3. Design Construction

The design consists of following steps:

- Determination of chuck key dimensions:
  In order to design the chuck key holder we have to consider the dimensions of chuck key & switch. Dimensions are as follows:
  - Diameter of switch shaft= 6mm, height is 28mm
  - Height of key is 96mm. other details are shown in fig.
  - Material selection:
  - As the holder has to sustain the load of chuck key, material of holder must be strong and rigid enough.
  - The material should not get wear out due to regular use of chuck key.
  - Material must be light in weight.
So we decide to choose wood as the raw material. Dimension of holder are 90x40x40. The detailed drawing of the holder is shown in figure below:

Figure 1: Chuck Key

Figure 2: Detailed drawing of holder
3. Working

The working of this holder is just like a switch knob. After tightening or fitting of the job in chuck, simply we have to put the chuck key in the holder because we have been replacing our switch knob by chuck key holder. Hence chuck key plays role of switch knob, without chuck key it is not possible to start the lathe machine. Now we can operate machine using this model for ON/OFF purpose. Once work is done we will pick chuck key from holder and use it for tightening or loosening. By this full proofing can be obtain and accidents can be eliminated totally.

4. Final Product And Testing

The knob is as shown in fig. below before our holder:

![Original knob](image1.jpg)

Figure 3: Detailed drawing of holder Original knob.

The new chuck key holder knob is as shown in fig:

![New knob](image2.jpg)

Figure 4: Newly developed knob.

We had taken successful trial in our work shop.
5. Optimization

In actual plastic knob is there. We first replaced it by wooden model. Then in optimization we decided to replace the wood material by PVC material because of following advantages:

- PVC has more strength than wood.
- Life of PVC is very good than wood.
- PVC is light in weight.

The design becomes more compact with PVC.

6. Advantages

This instrument has following advantages:

- Accidents on lathe due to chuck key can be completely eliminated
- Easy to manufacture.
- Easy to operate.
- Very less cost.
- Highly effective.

7. Savings

By this we can have savings in terms of:

- Money required for compensation of injury to operator.
- Production loss because of accident
- Prevention of damage of confidence of operator.
- Money saved in breakdown of machine

8. Conclusion

With this simple and less expensive solution we can totally control the accidents associated with chuck key of lathe. This can be made integrated part of machine while manufacturing machine.

References
