

Designing a dust extractor

Many schools adapt the large face-plate on the woodworking lathe as a sanding disc. As with all forms of disc sanding a considerable amount of wood dust permeates the air in the workshop.

Realizing that for anyone working for a period of time in this dust-filled atmosphere there is a considerable health hazard, it was decided that a group of third form pupils following a design course would attempt to solve this dust problem.

As far as we are aware there is no dust extractor of a simple nature commercially produced. The type of dust extractor fitted to some workshops are very expensive and are not always suitable for adapting to a lathe.

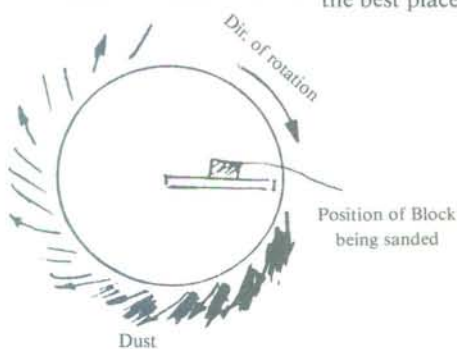
Some examinations allow the use of a disc sander to be used in the practical examination — this means that the sanding disc could be in use for several hours — as was the case in the WJEC woodwork CSE Examination this year.

Visually one could see the dust created and dust deposits could be seen throughout the workshop. However, we had no accurate means of measuring this dust. Several requests for assistance in measuring the dust were made without success, until finally we were very fortunate in obtaining the assistance of the Institute of Occupational Medicine Outstation, National Coal Board, Pontypridd. We are very much indebted to both Mr. C. Rickman and Mr. Cyril Jones, who gave us invaluable assistance with our project. They visited our school and loaned us dust sampling equipment for our recordings. We also made use of their scales for weighing the fine particles of dust — our own scales at school were not accurate enough — and we were able to examine the particles under a microscope. They also supplied us with papers on the harmful effects of wood dust and some pages from the Health and Safety Executive's Guidance Note EH40. These provided us with a greater understanding of the problem.

After considerable thought regarding the best method of removing the dust we started to build our prototype. Apart from the obvious design considerations we were very much concerned with the following:—

1. Safety.
2. Ease of assembly on to lathe.

We were able to see where the dust was thrown as the disc turned and as a result it was fairly obvious where the best place for trapping the dust would be.



Our prototype was made of plywood and the dust was removed by the use of a vacuum cleaner. In our initial sketches we had planned to use brushes and vanes to help trap the dust, but on experimenting we found that very little dust escaped and so the need for such fittings was unnecessary. At this stage we were testing for dust visually and while we thought that we had found a means of removing the dust this was not enough proof to warrant further development of our design. At this stage we were assisted by the officers of the Institute of Occupational Medicine. After several hours of testing with both static sets of pumps and personal sample pumps on different occasions, we were provided with very conclusive proof of the amount of dust circulating through the atmosphere in the workshop. Our evidence showed that the amount of dust taken in by the person using the lathe was *four (4) times that of the recommended limit* and of the other three pumps being used at this time, one showed a reading of almost double the limit while the other two remaining pumps showed levels marginally below the limit.

After having solved the dust extraction problem in our own workshop we circulated all the Secondary Schools in the County of South Glamorgan to see if they had a problem similar to ours. We were very pleased with the response shown to our efforts and some interesting results were gathered:—

50% of the schools used this type of sanding disc.
89% did not have dust extractors fitted to the lathe.

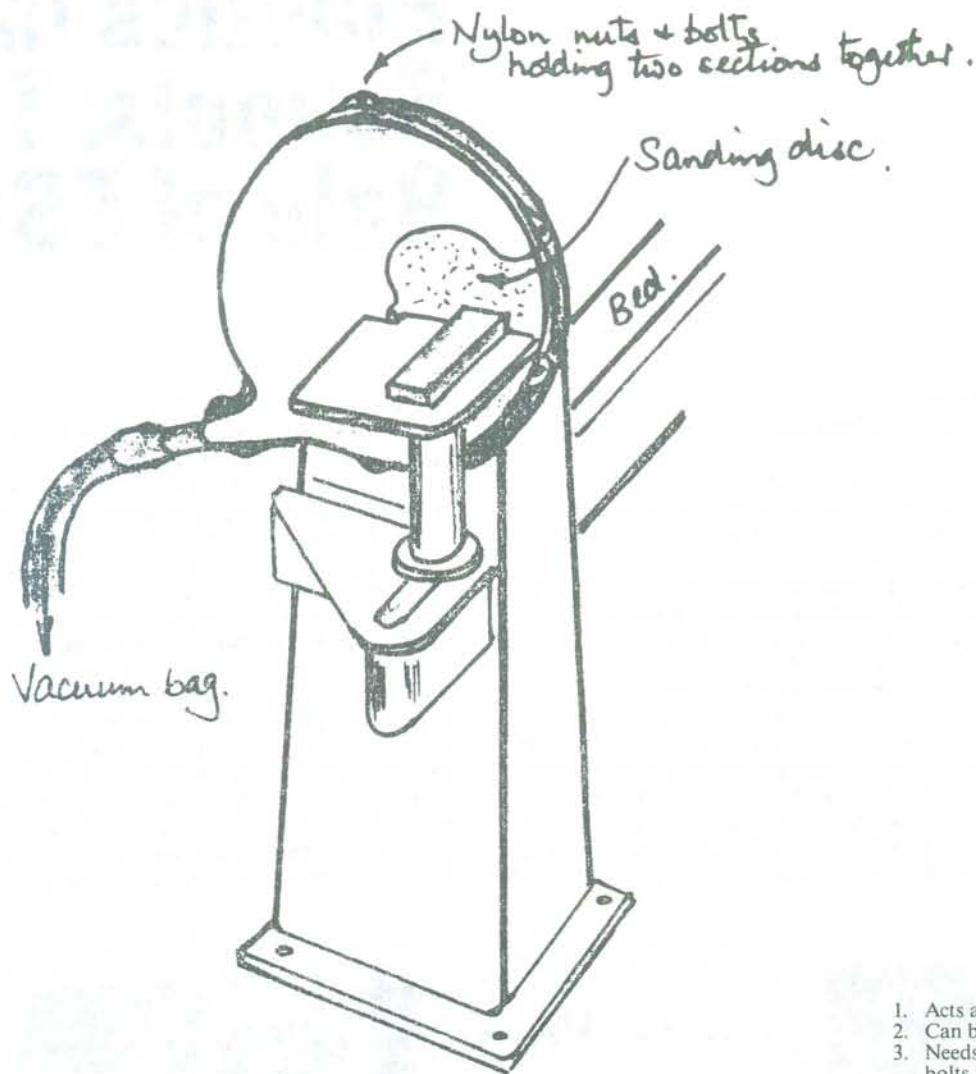
100% realized there might be a health hazard.

75% indicated that they would consider purchasing an extractor if it were offered at a reasonable price.

These statistics seemed to highlight the possible health hazard particularly to the teacher who might well be in the 'dust atmosphere' throughout the day.

Seeing there to be a positive need to try and develop our project beyond the use of our own school, we decided to try and produce our product in such a way that it could be mass produced. A pattern was made and again we were fortunate in receiving the assistance of a firm willing to provide us with the facility to vacuum form our product. Moreplas Plastics Ltd of Llanharan, Mid Glamorgan, provided us with this facility. Again no charge was made for their expertise and for materials supplied.

We feel that our product while it is very simple in design and construction is functional, can be fitted — with slight modification — to any lathe, is relatively cheap to produce and certainly minimises the possible health hazard caused by the dust.



1. Acts as dust extractor and safety guard.
2. Can be fitted in minutes.
3. Needs two 6mm holes drilled in headstock to take two bolts for fixing backpiece (A).
4. Front cover (B) is fitted to (A) by means of 5 nylon nuts and bolts.
5. Household vacuum cleaner fitted to extractor.
6. Slightly modified version can be supplied to fit most lathes or sanding machines.
7. Made of tough flexible plastic.

