

1. Whether the bolt, clamp and block to go under the heel of the clamp are readily at hand when wanted; whether they have to be dug out of a heterogeneous mass of such tools kept by the workmen in the bed of the machine, in a box or locker; whether they have to be "borrowed" from another workman—with or without his consent; whether the workman has to go to the blacksmith shop to get a piece welded on, a bolt to make it long enough, or to the carpenter shop to get a block of the right length cut off, etc., etc.

2. Whether the head of the bolt available fits the T slot in the machine or has to be ground or

filed to let it in; whether the length is just right or it is from one inch to three inches too long, necessitating either finding and putting on washers or old nuts to fill the gap, or screwing the nut down an inch or two further than should be necessary on a bolt of the right length.

3. Whether the nut fits properly on the bolt, so that it may be quickly and easily screwed on or off with the fingers, or whether it is so tight that it must be slowly and laboriously screwed all the way on and all the way off with a wrench.

4. Whether or not a wrench of the right type and size is readily at hand.

CCFJ		CCFG	
SIZE OF CLAMP		SIZE OF CLAMP	
D	L	D	L
1	1 1/2	1	1 1/2
1 1/4	1 3/4	1 1/4	1 3/4
1 1/2	1 7/8	1 1/2	1 7/8
1 3/4	2	1 3/4	2
2	2 1/4	2	2 1/4
2 1/4	2 1/2	2 1/4	2 1/2
2 1/2	2 3/4	2 1/2	2 3/4
2 3/4	3	2 3/4	3
3	3 1/4	3	3 1/4
3 1/4	3 1/2	3 1/4	3 1/2
3 1/2	3 3/4	3 1/2	3 3/4
3 3/4	4	3 3/4	4
4	4 1/4	4	4 1/4
4 1/4	4 1/2	4 1/4	4 1/2
4 1/2	4 3/4	4 1/2	4 3/4
4 3/4	5	4 3/4	5
5	5 1/4	5	5 1/4
5 1/4	5 1/2	5 1/4	5 1/2
5 1/2	5 3/4	5 1/2	5 3/4
5 3/4	6	5 3/4	6
6	6 1/4	6	6 1/4
6 1/4	6 1/2	6 1/4	6 1/2
6 1/2	6 3/4	6 1/2	6 3/4
6 3/4	7	6 3/4	7
7	7 1/4	7	7 1/4
7 1/4	7 1/2	7 1/4	7 1/2
7 1/2	7 3/4	7 1/2	7 3/4
7 3/4	8	7 3/4	8
8	8 1/4	8	8 1/4
8 1/4	8 1/2	8 1/4	8 1/2
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8 3/4	9	8 3/4	9
9	9 1/4	9	9 1/4
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9 3/4	10	9 3/4	10
10	10 1/4	10	10 1/4
10 1/4	10 1/2	10 1/4	10 1/2
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11	11 1/4	11	11 1/4
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14 3/4	15	14 3/4	15
15	15 1/4	15	15 1/4
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17	17 1/4	17	17 1/4
17 1/4	17 1/2	17 1/4	17 1/2
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17 3/4	18	17 3/4	18
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30 3/4	31	30 3/4	31
31	31 1/4	31	31 1/4
31 1/4	31 1/2	31 1/4	31 1/2
31 1/2	31 3/4	31 1/2	31 3/4
31 3/4	32	31 3/4	32

Figure 3  
Elementary Time Study Data Sheets, showing time for putting on and taking off standard bolts, clamps and blocks.

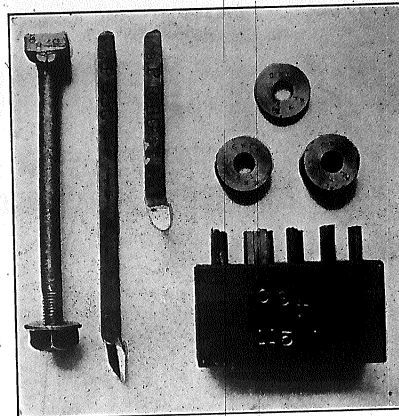


Figure 4  
Standard Tools. Clamping bolt, side tool, round nose roughing tool, washers for belt, set of "shims," or packing pieces, and small wedges.

I have seen a machinist whose job was to run a large planer, the time of which was worth not less than three dollars an hour, spend fifteen minutes at a vice trying to loosen the nut on a bolt that he wanted to use in clamping a job; the noon whistle blew while he was still struggling with it. I don't know how much more time he put in on it after lunch. The bolt was about 1" diameter and 12" long. I would call your attention to Figure 3 showing the time for putting on and taking off standard bolts, clamps, and blocks, from which you will see that for a bolt of the size mentioned the time allowed is eight-tenths of a minute.

In a machine shop run under the Taylor System standard bolts, clamps and blocks in ample assortment and ample quantity are kept in the tool room. In planning a job the number and size required to hold it is decided, the time allowed is entered on the instruction card, and they are called for on the list of tools that will be delivered to the machine in advance for the job; the bolts will be of the right length, as will be the wood blocks; the nuts will fit so that they may be screwed on or off with the fingers; and the heads of the bolts will fit the T slots of the machine. Furthermore, a wrench of the right type and size to fit

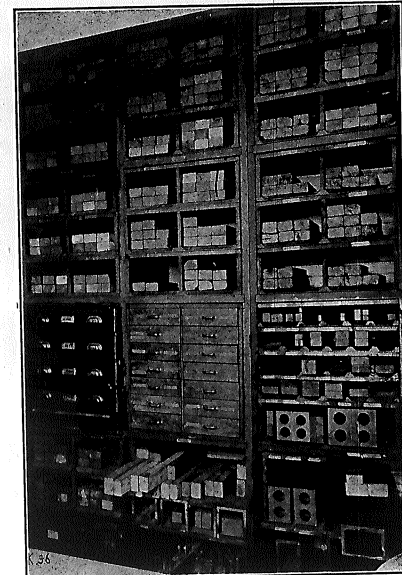


Figure 5  
Section of tool room showing standard wood blocks stored in standard bins.

the nut will be issued with the bolts so that the workman will not have to hunt for one, or to use that useful but inefficient tool, a monkey wrench. Of how much value would the time-study data shown be in a shop in which no standards exist?

I might cite a hundred or more similar illustrations of the advantages of and necessity for standard tools in machine shops, but I think one more will suffice.

Some years ago when studies were being made of the handling of twist drills—that is, selecting a drill of the required size from several issued for a job, verifying the size stamped on the body of the drill, putting it into a sleeve to fit the spindle of the drill press, and then into the spindle of the machine, and the reverse of these processes after drilling the hole—I was astonished and perplexed by the lack of uniformity in the time shown