Duenk, Lester, and Hahn, Marshall. "Stock-Cart Tool Wagon," *Industrial Arts and Vocational Education*, LIX (March, 1965), p. 80.

Gardner, George. "Tank Tote Tray," *Industrial Arts and Vocational Education*, LIII (November, 1964), p. 50.

Geiger, C.S.C., Brother Leo. "Tool Storage in the Woodshop," *Industrial Arts and Vocational Education*, XLVII (March, 1958), pp. 102-104.

Gifford, H. W. "'Lazy Susn' Tool Panel," *School Shop*, XXIV (September, 1964), p. 27.

Gunderson, B. Harry. "Engine-Lathe Tool and Equipment Storage," *Industrial Arts and Vocational Education*, LIII (March, 1964), pp. 79-81.

Heasley, William. "How to Improve Tool-Use Efficiency," *Industrial Arts and Vocational Education*, LI (October, 1962), pp. 31-32.

Kassay, John A. "A Rack for Hand-Screw Clamps," *School Shop*, XXIV (October, 1964), pp. 44-45, 98.

Kingsley, Russell J. "A Mobile 'Tree' for Storing Clamps," *School Shop*, XXI (March, 1962), p. 13.

Kinnamon, Donald. "Racks for Storing Power Tools," *School Shop*, XX (February, 1961), pp. 20-21, 47.

Loats, Henry A., and Others. "Tool Panel Arrangements at Ball State Teachers College," *Industrial Arts and Vocational Education*, XLIII (March, 1954), pp. 106-112.

Malkan, Jerome M. "How to Improve Student Note-Taking," *Industrial Arts and Vocational Education*, LI (October, 1962), pp. 33-34.

McNamee, Phillip L. "A Program for Conserving Shop Tools and Equipment," *Industrial Arts and Vocational Education*, XXXI (November, 1942), pp. 365-368.

Miner, Harvey D. "Area Panel Solves Tool Storage," *School Shop*, VIII (December, 1948), pp. 7-8.

Parsons, Owen G. "Balanced Tool Boards," *Industrial Arts and Vocational Education*, XLIV (March, 1955), pp. 97-100.

Pendered, Norman C. "Toolholder Evaluation Check List," *School Shop*, XXIII (September, 1963), p. 15.

Radcliffe, George V. "Toolholders – Panel or Crib," *Industrial Arts and Vocational Education*, XLIII (March, 1954), pp. 115-117.

Reed, Darrell L. "Wood Lathe Tool Rack," *Industrial Arts and Vocational Education*, LVII (May, 1968), p. 49.

Salvatore, Joseph. "Electronics Tool List," *School Shop*, XXV (January, 1966), pp. 22-23.

Short, Henry C. "Simplifying Tool Checking in the Machine Shop," *Industrial Arts and Vocational Education*, XXX (December, 1941), pp. 442-443.

Wagner, W. H. "Localized Tool Panels," *Industrial Arts and Vocational Education*, XXXVII (March, 1948), p. 100.

Waltrip, Gerald L. "Toolholders – Their Design, Construction, and Location on the Tool Panel," *Industrial Arts and Vocational Education*, XL (March, 1951), pp. 120-129.

Yeley, Max T., and Peticolas, Sam C. "Inserts Provide Flexibility on Tool Panels," *American Vocational Journal*, XXXVII (May, 1962), p. 20.

TOPIC 21

Provide a Tool Checking System

Tool checking systems are essential in general shops. Teachers need to plan and institute a system which may be directed and managed by student officers. A system suitable for a specific teaching situation will depend on 1 methods used to store tools, 2 type of tools used in the shop, 3 number and character of students, and 4 interests of the teacher.

Systems for shops having tool cribs necessarily need to be somewhat more involved than those with panels located throughout the shop. Where there are only a few tools or where the tools are large, the system may be simplified. It may also be streamlined for students who are mature and dependable.

In some of the larger schools which have several shops, one tool crib has been planned to service two or more shops. Checking tools out and in from these multi-purpose cribs is often under the supervision of a paid attendant.

This topic reports those tool checking systems and practices that have been highly successful in teaching situations. The teacher who plans carefully will be able to select those features that seem suitable for his program. Experienced teachers concur in this advice. "There are a great many ways of checking tools in the general shop. . . . the best method, of course, is the one which makes the tools most accessible to the students."[1]

Purpose and Value of a Tool Checking System

These six values are advanced for a tool checking system:

1. It reduces the possibility of losing tools or misplacing tools. (Safety)
2. Missing tools are quickly identified.
3. Responsibility for tools is placed on individual students.
4. The number of tools being used by a student at any one time is kept under control.
5. Names of tools are taught.
6. It indicates which student is using a particular tool.
7. Enhances quality of learning

[1] M. F. Thurmand, "Checking Tools By Color," *Industrial Arts and Vocational Education*, XXXIII (April, 1944), p. 160.

Ways to Identify Tools

All tool checking systems are predicated on a way to identify tools. Four plans are described. One or more of them may be used.

1. *By means of the tool holder.* Here the tool holder is constructed so it indicates the kind and number of tools.
2. *By means of silhouettes.* Silhouettes are placed in back of the tool in the cabinet or on a panel.
3. *By pasting a picture and a number beside each type of holder.* The picture shows what tool belongs in the holder, and the number indicates the quantity.
4. *By placing the name and the number of the tool by the tool holder.* Labels having the names of the tools are placed near the brackets. The names may be embossed on aluminum or brass strips with the equipment used to label wood patterns in a patternmaking shop. Labels may be also printed on very thin tissue paper and shellacked in place. Holders containing typed cards protected by thin plastic also work well.

Tool Checks

Tools stored in tool cribs may be controlled with numbered metal checks, one inch in diameter, which have been stamped out of heavy brass sheets. The shop number, which is the one assigned to each student for organizational activities, is stamped on the check. This number is the one used to designate a seat in an instructional area, a compartment in the lockers, a name location on the progress charts, as well as for checking tools. Usually four or five checks are stamped for each student. A small hole near the rim of each check is used for hanging them up or fastening them together. The number on a tool check can be made to stand out by wiping dark paint over the stamped number.

Tool Check and Attendance Board

This device may be made by placing rows of small "L" hooks on a piece of ¾ inch plywood. This board needs to contain as many hooks as there are students in the largest class. These hooks are spaced far enough apart to accommodate four or five stamped brass checks which are hung on the board with a shower-curtain hook or a large horse-blanket pin. Consecutive shop numbers are also stamped into the plywood either below or above the hook. Where this device is in use, it is usually hung on the wall just inside the entrance of the shop.

As the student enters the shop during the passing of classes, he removes his checks from the board so he can use them during the period to check out tools. A student officer, such as the record clerk, is assigned responsibility for supervising this administrative aid. As the

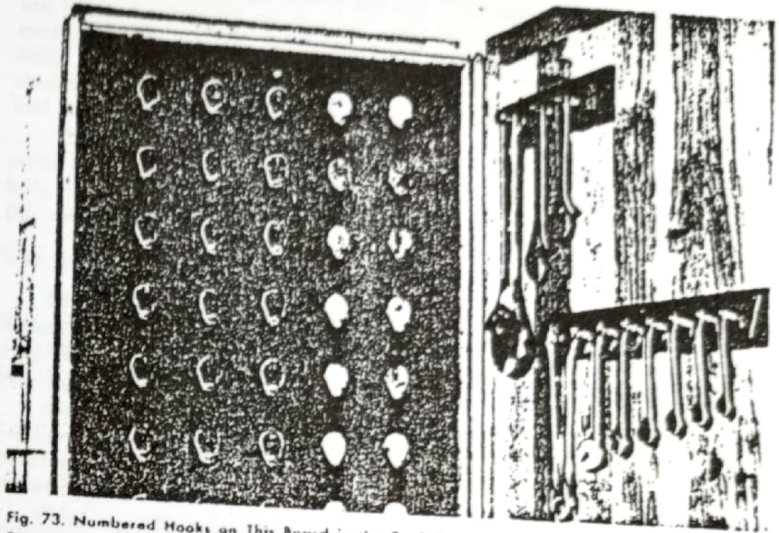

Fig. 73. Numbered Hooks on This Board in the Tool Crib at Pershing High School Provide an Easy File for Students' Check-Out Slips for Tools (Courtesy, H. Earl Wright and Detroit Public Schools)

period starts, this officer is instructed to remove all checks from the hooks that are regularly assigned to students, so that they may be used to determine those who are absent or tardy for the day. Any student late to class or who has forgotten to pick up his checks will need to call for them at the record clerk's desk. Where this system is used, it has been found to be a good practice to have the superintendent ask the record clerk, during the short formal program at the beginning of each period, to read the names and numbers of those who are absent or tardy. This technique makes the system effective.

At clean-up time, each student is responsible for returning the set of checks that he has used during the period to the check and attendance board. The record clerk then inspects the board before the class leaves to ascertain that all checks have been returned and that this device is in order for the incoming class.

TOOL CHECKING SYSTEMS

Check Boards in Tool Cribs

A plywood board containing hooks for stamped tool checks is placed near the door just inside the tool crib. Checks are hung directly on "L" hooks, and when a student asks for a tool, one of his checks may be taken from the check board by the toolman and hung beside the tool holder while the tool is out.

Another plan is to provide a second board containing pictures of tools and hooks to be hung alongside the one with tool checks. Pictures of tools that need to be checked are cut from catalogs and cemented one below the other in the left-hand column. Horizontal rows of sufficient hooks are placed after each picture. As a student secures a tool, one of his checks is simply moved from the check board to a hook following the picture of the tool. As tools are returned, checks are moved back to the board where they were in the beginning. At no time does the student handle his own checks.

Emerson W. Riggs studied various tool checking systems. This is what he discovered about tool cribs:

The advantages are:

1. All tools are centralized in one place so that they may be placed under the supervision of one or more attendants and be kept under lock and key.
2. All tools can be readily checked.
3. The responsibility for the return of tools is placed on the student.
4. Students learn to identify tools as they ask for them.
5. The system acquaints students with the practices used in industry.
6. Any tool can be quickly located by checking the student's check number on the board.
7. Students cannot sort out tools in an effort to select those they believe to be in best condition.

The disadvantages are:

1. There is a bottle neck at the beginning and end of the class period.
2. Tools are not handy to work stations and areas.
3. The supervision of the tool crib takes the partial or full time of a custodian.
4. An enclosed tool crib is a potential location for "horseplay" and "goldbricking".
5. Some tool checks become lost.
6. Tool checks are sometimes mixed up or misplaced.
7. A hook must be provided near each tool on which to hang the check.
8. Each student must be assigned a shop number.[2]

During the period that tool cribs were being advocated for unit shops Vaughn and Mays had this to say about the system:

The individual in charge of the toolroom (crib) for a definite period may be held strictly responsible for the order of the toolroom, and through his records each individual in the class may be held responsible (in turn) for the tools and their condition. . . .[3]

2 Peg Board Control

The peg board is made by mounting a wooden panel inside the tool crib. Shop numbers for students (as many as there are in the largest class) are placed across the top. The names or pictures of tools are located vertically on the left side. Several holes are drilled after each name or picture and under each shop number. Pegs to fit these holes are placed in a box fastened to the lower part of the panel. As a student calls for a tool, a peg is placed after the name or picture of the tool and below the student's shop number.

The advantages and disadvantages are about the same as for a metal check system. Sometimes a toolman will place a peg in the wrong hole. Such errors lead to controversy when there is an attempt to hold the wrong student responsible for a missing tool.

[2] Emerson W. Riggs, "Tool Storing and Tool Checking," (Unpublished Master's Essay, Wayne State University, 1951), pp. 7, 8.

[3] Samuel J. Vaughan and Arthur B. Mays, *Content and Methods of the Industrial Arts* (New York: The D. Appleton-Century Company, 1924), p. 358.

3 Tool Check Sheets

In this system, the names of tools to be checked are printed alphabetically on sheets of paper. After the name of each tool, there appears a series of small squares large enough to accommodate the shop number of a student.

After a student makes a request for a tool, he then writes his own number in the proper square while the attendant at the tool crib is securing the tool. The toolman crosses off the numbers as the tools are returned.

There is a sheet for each class with the date and hour of the class indicated. These sheets are signed by the tool crib attendant and are filed at the end of each class period.

4 Picture Check Sheets

The only difference between this plan and tool check sheets just described is that small pictures or pictorial drawings of tools are used in place of the printed names of the tools. This technique speeds the system up at the tool crib. Younger students are able to locate the pictures more quickly than they do the printed names, but they are less apt to learn names of tools quickly since it is possible for them to point to the picture and say to the attendant, "give me this tool".

Riggs made this evaluation of printed check sheets:

The advantages are:

1. The responsibility for the care and return of a tool is placed directly with the student.
2. Since the student is expected to ask for the tools by name, he soon learns to identify them.
3. All tools are centralized under one lock.
4. The tools are under the custody of one or more tool attendants.
5. Tools can be readily checked, and immediately located.
6. Students cannot inspect the tools in an attempt to select those in the best condition.

7. The custodial assignment may be made a rich educational experience for a student officer.
8. A record is on file of all tools taken from and returned to a tool crib.

The disadvantages are:

1. There is usually a "bottle-neck" in front of the tool crib door at the beginning and at the end of each class period.
2. It is usually a full-time job for at least one student to supervise the checking out and in of tools.
3. Considerable time is consumed in tool procurement when the tools are not located near the work station or area. This also encourages students to borrow tools from others in the shop.
4. An enclosed tool crib is always a potential location for "horseplay and goldbricking."[4]
5. Takes longer to learn names of tools

The Requisition System

In this plan, the students are furnished a small printed form on which they write their name, hour class, date, and list the tools they need. This is presented to the toolman who issues the tools and files the requisition. At the end of the period, the form is again returned to the student when all of the tools that were listed have been returned. This system is explained in detail by John Nowak; he reports that it is a splendid technique for teaching the names of tools.[5]

The system is, however, time consuming. Ericson and Seefeld have this to say about it:

> Various means for keeping a complete check on tools may be used. Some prefer to have students write on a paper the names of the tools they wish to obtain. This may help them learn the correct name of the tool and how to spell that name. But it is a waste of time, and tends to diminish interest because the student is interested in doing his job.[6]

Not Necessary to Check All Tools

The students' work period can be extended by checking only those tools that are likely to be misplaced. It has been previously mentioned that these are the small items, such as pliers, rules, drills, and scribers. Such tools as hammers, planes, levels, and saws are not likely to disappear. Those teachers, however, who only check on the items that are likely to disappear or be misplaced usually also include the precision instruments and tools with the items to be carefully checked. The checking of these items appears to have a good psychological effect on the students. It promotes the need for careful handling and emphasizes the value of precision tools and instruments.

[4] Riggs, *op. cit.*, pp. 13, 14.
[5] John F. Nowak, "Teaching Tools," *School Shop*, IX (January, 1950), p. 14.
[6] Emanuel E. Ericson and Kermit Seefeld, *Teaching the Industrial Arts* (Peoria, Illinois: Chas. A. Bennett Co., 1960), p. 107. (Quotations from this book used by special permission of the publishers.)

Procedure for Loaning Tools

Teachers need to be very careful about loaning tools that have been racked for instructional purposes. Where tools are loaned overnight or over a week-end to students, it is suggested that special kits and special tools be purchased for this purpose.

Many of the incidental jobs that come up around a school can be done with a hammer, screwdriver, pliers, and a hand drill. Many teachers have constructed a kit for such tools to be loaned to other teachers for these jobs.

When it becomes necessary to loan tools, the borrower should be expected to fill in a printed loan slip calling for: name of borrower, name of tool borrowed, date, and length of time desired. While the tools are out of the rack, it is suggested that heavy tags, indicating that the tool is on loan, be attached to the tool holder.

A Lesson to Explain the Tool Checking System

Early in the term, an organizational lesson needs to be scheduled, so students new to the shop will be in a position to take over responsibilities for the tools. Here is a teacher's outline for such a lesson.

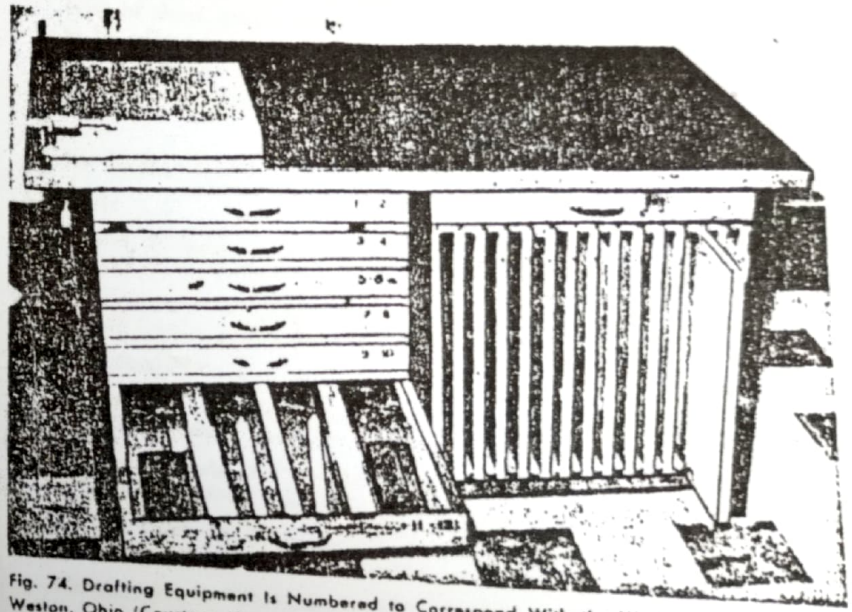

Fig. 74. Drafting Equipment Is Numbered to Correspond With the Work Station Number at Weston, Ohio (Courtesy, Harvey D. Miner)

OBTAINING TOOLS FROM TOOL CRIB [1]

Introduction:

Boys, last week we talked a little more about our shop organization, and then we chose our class officers. We also talked about the responsibilities of some of our officers, but we did not have much time to talk about the work of our toolman.

Since the care of tools and method of handling them is of utmost importance, I have saved it until last. So that we may all become familiar with the responsibilities of the toolman and your part in obtaining tools from the tool crib, I will explain the system that has developed as we have worked together.

I. How it works:
   - A. Each of you has been given a shop number.
   - B. Each student will be allotted five tool checks which have your shop number stamped on them.
     1. The checks are hung at the bottom of the board that has been provided for checking the tools.
     2. There is a hook for each student in the class. Your shop number is found under the hook.
     3. There is also a hook for each tool in the tool crib after the picture of the tool.

II. Obtaining tools from the crib:
   - A. When a student requests a tool, the toolman removes the tool from the rack and places it on the counter, and takes a student's check from the bottom of the board and places it on a hook for that tool.
   - B. Each student should wait to see that the toolman places the check on the correct hook.
     1. This rules out the chance of a student being charged with the wrong tool.
     2. It also is a constant check on where all tools are during the period.

III. Returning tools:
   - A. Wait your turn in line at the tool crib window, and do not crowd the others ahead of you.
   - B. Announce your number as you return the tool.
   - C. Wait until the toolman removes your check from the hook and replaces it at the bottom of the board.

IV. Tool checks:
   - A. Since the checks are so easily lost they are not issued directly to you.
   - B. This system makes it possible for the toolman to know how many tools are out.
   - C. This system helps you:
     1. For example, if there are two of a certain tool and both are in use, you can go to the board and find out which students are using them.
     2. It prevents any one student from having too many tools at one time.

V. Conclusion:

The method that we are using is similar to those used in industry.

VI. Review Questions:
   1. How would you obtain a hammer from the tool crib?
   2. What do you do when returning a tool?
   3. List the responsibilities of the toolman.
   4. List the steps in the tool checking system.
   5. Why aren't the students in the class encouraged to handle the tool checks?

[1] Bernard L. Coker, teacher at the Hutchins Junior High School, Detroit, Michigan. (Developed while a student at Wayne State University, Detroit, 1949.)

For Discussion

1. What are the values and purposes of tool checking systems?
2. What devices are used by teachers to aid students in returning tools to a designated location on tool panels or in tool cabinets?
3. Describe methods used for checking tools out and in at tool cribs.
4. Where there is a tool check system, what techniques may be used to avoid the loss of brass checks?
5. Are tool check systems needed in all types of school shops?
6. List the names of tools that are most often lost or misplaced in school shops.
7. What should the teacher do when a toolman reports that some tool is missing?
8. Sometimes tools are missing from a tool panel or cabinet because they are out for repair or have been loaned. What could the teacher do to aid a student toolman in accounting for these?
9. What is a good procedure to follow when loaning tools to other teachers?

Assignments

1. Design and describe a tool-checking system for a specific teaching situation. Preface the report with information about the school, the type of shop, grade level and type of student, and the major activities to be offered.
2. Outline a lesson that would explain the tool checking system developed in Assignment 1.

For Further Study

Books

Ericson, Emanuel E., and Seefeld, Kermit. *Teaching the Industrial Arts*. Peoria, Illinois: Chas. A. Bennett Co., Inc., 1960, pp. 107-108.

Littrell, Joseph L. *Guide to Industrial Arts Teaching*. Peoria, Illinois: Chas. A. Bennett Co., Inc., 1966, pp. 142-144.

Periodicals

Glazener, E. R. "Tool Storage," *Industrial Arts and Vocational Education*, XXXVIII (March, 1949), pp. 98-99.

Martinetz, Charles F. "Checking Out 600 Tools in a Few Minutes," *Industrial Arts and Vocational Education*, XXXIII (June, 1944), pp. 234-236.

McCirr, Clint. "A Tool-Check System That Works," *Industrial Arts and Vocational Education*, LIII (March, 1964), p. 82.

Nowak, John F. "Teaching Tools," *School Shop*, IX (January, 1950), p. 19.