101 TIPS

ON IMPROVING

PRODUCTION WITH COIL

HANDLING EQUIPMENT

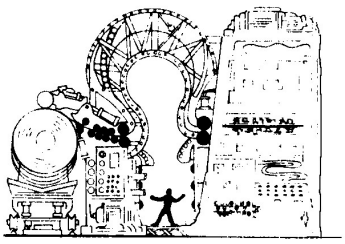
FORMTEK-MAINE

I. The first section of this presentation is aimed at the proper selection of coil handling equipment, for those who are going into its use for the first time, or may be adding coil equipment for new and expanded applications.

1. Do your homework thoroughly before seeking quotes on coil handling equipment. Anticipate as best as possible all the jobs, or at least the full range of specifications you will wish to cover with one line. Be equipped with the minimum and maximum ranges of coil weights, O.D.'s, I.D.'s, stock widths, feed lengths, line speeds, strokes per minute, stock thicknesses, material types, and feed accuracies required. Bring any unusual conditions, to the attention of the coil equipment supplier. Do not overlook extraordinary material conditions such as high tensile and yield strengths, or predisposition to marking, or slick material finishes. Most coil equipment is rated in terms of mild steel and compensating judgements have to be applied to other materials.

2. Seek advice from experts. Consult with those who have performed similar applications. While naturally quarded in their proprietary interests, metal stampers are a practically unique community in their willingness and ability to share worthwhile tips with fellow citizens. Use the expertise of your material suppliers. They have encountered all the imaginable conditions with the material they handle, often have to solve problems for their own production interests, and are aware of most of the treatments other users have applied to difficult conditions. Discuss the application and equipment thoroughly with experienced and knowledgeable representatives of the coil handling equipment manufacturers. There is no substitute for having these people to your plant to see the type of work you are doing, judging the utilities and space available, and recommending what is the best for your individual needs.

3. Do not try to make coil line a universal catchall for every conceivable stamping operation in your plant, or that you can think of. Someone, somewhere will come up with equipment to cover it all, but it is going to be far more expensive than what you anticipated or really need, and it is not going to operate efficiently in the bulk of your applications. or even three relatively simple coil lines can be purchased for a lesser cost than one master line, and operate far more efficiently within their limited ranges.



#3 — THE UNIVERSAL CATCH-ALL. "IT DOES GREAT ON THE TRUCK BODIES, BUT WE HAVE PROBLEMS WITH THE GLOVE COMPARTMENT LATCHES."

4. Think of terms of selecting coil equipment as a system. Equipment applied to perform all your coil handling functions from one source will be better coordinated to operate efficiently than any piece-mealing. Initial cost savings entailed in buying stock reel, straightener or feed from three separate low bidders is quickly eradicated by the difficulties in synchronizing the three. One-source co-ordinated application, and one-source responsibility for performance can be extremely valuable over the productive life of your equipment.

5. Remember your goal in applying coil equipment to your stamping operations—higher production—parts off the press! Select your equipment to ensure the highest practical percentage of running time. The capability of running off 12" parts at 200 strokes per minute

is drastically misleading if coils are depleted every 15 minutes and it takes another 15 minutes to reload and thread. Select the proper loading and threading equipment from the beginning.

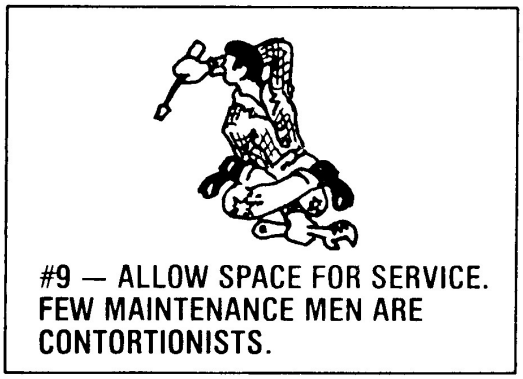
6. Secure good thorough data from your equipment suppliers. Thorough literature, quotation presentations, equipment sizes, space requirements, and systems layout drawings are essential to letting you know what to expect in the equipment you are buying. As the motel people are fond of saying, "the best surprise is no surprise".

7. Secure and use the free handout guides, which are available from material and equipment suppliers. There are coil weight and length calculators, free loop guides, metric converters, and stock gauge converters available from many sources. They can all prove invaluable in your use of coil equipment, and should be made available to shop supervision and set up personnel as well as engineering and purchasing.

II. With coil equipment having been properly selected, it is worthwhile to look at a few points to consider when installing your equipment.

8. Make sure you position equipment allowing the proper amount of space for the free loop of material is necessary to synchronize the various functions of coil handling. Too small or too large a looping area can be disastrous to all your well laid plans.

9. Always allow adequate space for adjustment and servicing of equipment. Crowded conditions for your set up men and operators can lead to safety hazards, overlooked adjustment and maintenance, and time-consuming extra maneuvering.



10. Align equipment very critically. Extra time and attention paid to alignment at installation can save a myriad of headaches in subsequent operations. Remember the automatic equipment cannot feel and compensate for misalignment the way your man did when he was hand feeding.

11. Always, repeat always, lag equipment securely to the floor, or securely to the press where appropriate. Unsecured coil equipment is not only a serious safety hazard, but it will cost substantial time and scrap due to unavoidable misalignment incurred during operation. If equipment is to be moved occasionally from press to press, do not sacrifice lagging. Lagging bolts in a fixed position will save you more time in positioning and aligning the equipment than what can be saved by their elimination.

12. Machines can be installed on common mounting plates to ensure maintenance of their relative position and alignment.

13. Channel iron or I-beam rails for common mounting provisions can supply a secure base, elevated for additional slack in the loping area, and protective of conduit which might be run between units.

14. Threaded tie bars connecting machines can be quite useful in achieving and maintaining precise alignment.

III. Assuming you have coil equipment properly installed, let's take a look at a few considerations in the loading and threading of your coil lines.

15. You say you're one of the people who has the 15 minute coil changeover time, twice an hour. Can you install a double spindle stock reel? You could be loading that coil on one spindle while the other spindle was paying off stock. When one coil is depleted the other can simply be indexed into position, ready for operation within seconds.

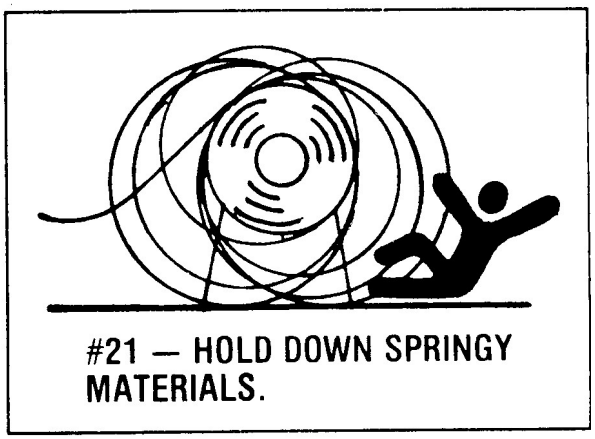
16. Because of location and space limitation you may not have room to index a double reel. Do you have room on one side to run a coil loading car and track? Could you add such a feature to your existing reel? If not, would it be worthwhile to purchase one with a new reel? Remember, you could have that coil sitting in position on the car, all centered, and ready for loading when the other coil finishes without tying up your coil lift.

17. If you do not have crane availability consistently enough to keep the coil car occupied during operation, perhaps a coil storage rack in conjunction with the loading car would remedy your problem. Such a rack could hold 3 or 4 coils in reserve. Even a full day's coil production of large coils is sometimes placed in reserve at the loading in this manner.

18. Have you looked at your coil loading facilities lately? They could be the hang-up in your production. Keep them as updated as your coil handling equipment, your presses, and your dies to achieve optimum production of all. Perhaps coil loading hooks will save you time over rigging up slings. Perhaps a tow motor will allow better maneuverability than your crane. Your tow motor might be equipped with a special pallet arrangement or coil core bar suited to your coil size and the type of mandrel you are loading.

19. Are your personnel hanging the coil on the mandrel, then attempting to manually expand against the coil I.D. Not only is a great deal of wasted effort expended in this manner, but additional time is consumed, and greater wear put on the expansion system of the reel. Make sure they are centering the coil on the mandrel with the lifting device, than holding it there until they have fully expanded against the coil I.D.

20. If this approach is still to unwieldy in time and effort, select your stock reels with powered expansion systems.



21. When you cut the retaining bands on your coils, does material tend to want to fill up your whole shop? If you are using stock reels, they should be equipped with hold-down arms for springy materials. These are usually air-operated rider arms which can accommodate various coil diameters.

22. Perhaps you should think about running springy material in a cradle instead of a reel. In that way the full weight of the coil is resting on the outer wrap to prevent it from coming loose. Cradles can also be equipped with hold-down arms as additional precautions.

23. If you select a cradle you can facilitate loading by having it equipped with a coil loading ramp in conjunction with a coil catcher.

24. Coil loading ramps can be installed in tandem to serve the same purpose for coil cradles as storage racks and coil cars do for stock reels.

25. Do curses fill the air during threading procedures as personnel try to manhandle stubborn material from one machine to the next? Consider hold-down-peeling systems in your equipment. These are indispensable for high production operations with heavy materials.

26. Sometimes just individual features of a hold-down-peeler system can be employed to improve your loading and threading procedures. Consider the inching drive feature for your stock reel.

27. Consider the air lifted pinch roll arrangement for your straightener.

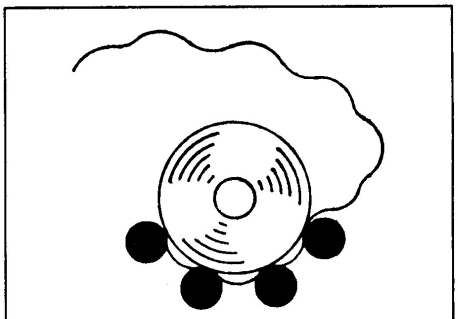
28. Does an operator get tired of dragging material over an 18 foot looping area? Do you get tired of the dirt and grit from the floor showing upon your parts and in your dies when he gets tired of carrying? Consider a simple air operated threading table to span the looping area right up to the entrance and stock line of your feed. It serves the dual purpose of providing a barrier to the looping area while in the lowered position.

29. Do your operators try to jockey around the unwieldy coil stock while making set up adjustments on the straightener or feed? Have them cut off a 2 or 3 foot strip of the material they are going to handle. It is much easier and quicker to handle while making adjustment, and will enable you to achieve the results you need on the coil stock.

III. To cover the operation phase of coil handling equipment let us take it function by function starting with the uncoiling process.

30. When using stock reels, most long-run, high production operations will employ a non-powered or plain stock reel in conjunction with a power driven straightener. If the straightener is powered there is no sense in adding the difficulty of synchronizing another

31. power train in the reel. It happens to be easier, too, to synchronize the free loop from the powered straightener since the material is being powered from its surface, not from the core which results in an awkward speed ratio as the coil depletes.



#31 — THIN OR LOOSELY WOUND STOCK CAN ''BUBBLE'' BETWEEN CRADLE ROLLS, HANG UP, OR DISTORT BEYOND ABILITY TO BE STRAIGHTENED.

32. Naturally, if there is no powered straightener, the uncoiler must be powered to supply slack material to the intermittent feeding device. If the material is thin and subject to deformation a stock reel must be used.

33. If the material is substantial enough and not fussy about surface conditions, it can be uncoiled from a cradle, which is powered and has similar synchronization advantages to a straightener, that is powering the material off its surface.

34. Suppose you are locked into using a powered reel, but cannot afford the space required for free loop. All is not lost. You can use a so-called paddle type loop control, if your

material is not too narrow or subject to the abrasion resulting from pulling one wrap over another. This device generates loose wraps underneath the coil. They trip a "paddle" or limit switch located in the base to shut off the reel when slack has accumulated. A powered reel equipped with such a device can be located as close to related equipment as a plain reel, while accumulating a surprising amount of slack.

35. Perhaps your material tends to distort on the expansion arms of the reel due to the amount of pressure which has to be applied to get a firm grip on the coil I.D. Several inner wraps of material may be lost in this way at considerable expense. Equip your reel with a drum type mandrel. This provides practically full circular support on the I.D. of the coil.

36. Do you run at high speed with a plain reel, so that if your brake is adjusted light enough to supply just adequate tension on the stock during operation, the reel overruns badly at stopping? Use an air brake with a 2-pressure system so that you have a drag pressure while running, and a high pressure stop when needed.

37. You can take the previous technique a step further if you have a case where adequate drap pressure for a full coil is far too high for a nearly depleted coil, causing you to have to make intermediate adjustments. An air brake can be equipped with a variable torque control. Essentially a rider arm follows the coil down and adjusts pressure automatically as the coil depletes.

38. Are you using optimum coil sizes? A 60" O.D. coil carries approximately 60% more surface feet of material than a 48" O.D. of the same gauge. Can you obtain your coils in higher outside diameters? If so, you should check to see if you have adequate handling facilities for larger coils. It may be very worthwhile to invest in heavier equipment to obtain the longer continuous runs, and reduce changeovers, storage space and coil end scrap.

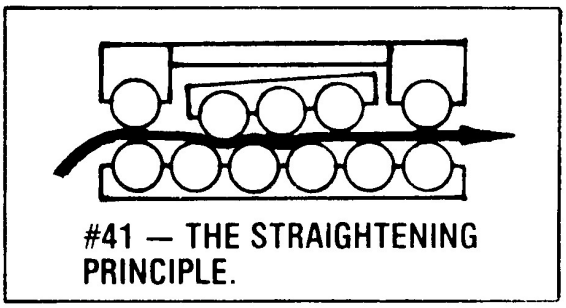
39. Do you run narrow width coils which tend to telescope and collapse? Perhaps you should be using the horizontal pan type reels so the coil is always lying flat on its side.

40. You say you switched material suppliers at a significant cost savings, but you can't run your material now because the inside diameters are larger. Or maybe you intentionally obtained I.D.'s to reduce the severity of coil set and possibly eliminate straightening. Most stock reels can be equipped with so-called coil arm spacers. They are a simple bolt-on, piggy back arrangement to increase the expansion range of your reel. They can be readily removed if you should revert to the lower I.D. Don't shove 2 x 4's between the coils and the arms. They are obviously unsafe, put the load off balance and can damage the equipment.

IV. Having covered a few ideas concerning the uncoiling function, let's turn our attention to the straightening process.

41. Understanding certain basic principles of straightening is necessary to getting the best results. In simple theory, three staggered rolls should be sufficient to straighten any material so long as the degree of coil set remained constant. Since it does not remain constant, increasing in severity as the coil depletes, it would be necessary to continually adjust these rolls to obtain results. That is why a wide range of multiple roll machines are made, to take out the severest set without overstraightening milder set, and without requiring adjustment through the coil. The tip then is that the more rolls that are employed, the wider the range of coil set that can be effectively accommodated. As it happens, the thinner the material, the wider the range of set, so that thin materials usually require more straightening rolls.

42. The next basic principle, which is quite obvious, is that the thicker the material the larger in diameter the rolls must be to apply adequate pressure to straighten without flexing or worse. Heavy materials then, generally require fewer rolls of larger diameter.



#41 — THE STRAIGHTENING PRINCIPLE.

43. A compromise on these principles can be made by using relatively small diameter rolls backed up with single or multiple tiers of additional rolls. This approach allows wider range of materials to be handled, but often at considerable additional expense.

44. Most coil stock straighteners are equipped with an odd number of rolls, with the extra roll generally in the lower bank. This is because material is generally uncoiled from the top of the coil, placing the coil curvature with the "belly up" so that the straightening rolls want to be always pushing upward. An advantage of this arrangement is that a slight upward curvature can be induced into the straightened material through careful adjustment. Such a curvature helps slide the material more readily through the die.

45. Some materials do have what is called "reverse coil set". This happens frequently in processed or pre-finished coil. Sometimes this condition can be handled in conventional coil straighteners by simply running material off the bottom of the coil, but it must be cautioned that such an approach can introduce material control difficulties and awkward pulling angles.

46. Coil set may even reverse itself within a given coil. The most universal approach to handling reversing coil sets is to have a straightener equipped with an extra, independently adjusted roll at the exit to knock down reverse sets when needed. These are commonly called "overshot rolls".

47. The question often arises whether a given straightener has the ability to correct a particular coil set condition in a given material. The readiest answer is to see whether the straightener will overstraighten such a condition. If so, it can be adjusted to straighten. Naturally material must be within the rated capacity of the machine, and test adjustments should be made gradually up to the point of overstraightening to determine whether undue strain is being placed on equipment.

48. Most coil stock straighteners have calibrations to determine roll settings for a particular material. There is an absolutely infinite variety of settings for particular models and materials, so no one can specifically advise proper settings. Initially, it is a trial and error experience, but once proper straightness is obtained for a particular material in a particular straightener the calibrations should be recorded and filed with the die or job sheet, never to have to be experimented with again.

49. For particularly intricate straightening requirements, and where more specific roll setting information is desired, dial indicators can be installed on staighteners in place of reference calibrations. Remember to establish a common starting point for all adjustments when using dial indicators.

50. If proper looping area is allowed after straightening, material should not be re-distorted. If re-distortion does occur due to slightly inadequate space availability, and in spite of the most

careful material support provisions, it is often possible to remove this mild distortion with a simple pull-through straightener after the looping area.

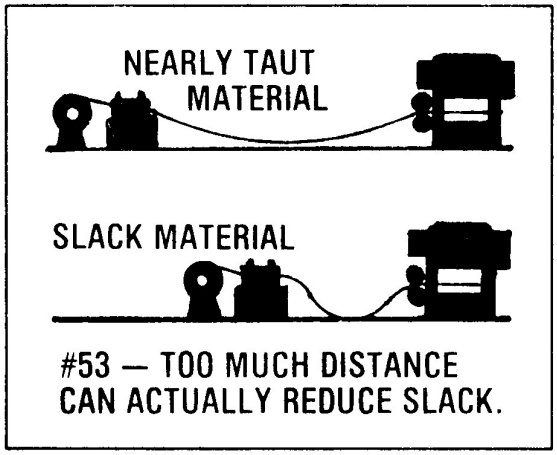
51. Remember that wire or narrow ribbon stock often has to straightened in two planes and there are special devices available for that purpose.

52. Circular parts which may require straightening after stamping will generally require two passes through a straightener, one at 90 degrees to the other. This is because there is no means of orienting the direction of curvature to the direction of the rolls. If a high volume of such parts exist it may be worthwhile accomplishing the job in one pass by using a dual head parts straightener which indexes the part 90 degrees through two heads.

53. If the available looping area is marginal, some relief can be ortained by having the straightener mounted in an angular head configuration. Such an approach starts the material down into its natural loop formation before exiting the straightener. It can also be advantageous in accepting the stock from a closely positioned reel or in a cradle combination.

VI. Prior to feeding in coil stock operations we generally have to accumulate slack material. Since this requirement is one of the least understood and most misused, among those just familiarizing themselves with coil stock operations, it is worthwhile touching upon some of the considerations which will be encountered.

54. Contrary to what you may have heard, allowing all the distance possible is not the answer to providing a proper looping area. The purpose of providing a free loop is to accumulate slack, and all slack is accumulated in a vertical direction, not horizontal. Slack is only the difference between all the material hanging in the loop and the horizontal length of the loop. That horizontal length represents only taut material. Once a stock line height is fixed, any horizontal length which is greater than what is required to let the material fall naturally slack, simply subtracts from the amount of slack material. Nominally, we think of the horizontal length required as being 1440 times the heaviest thickness you will run in that line. Certain considerations can even shorten that distance to your advantage. If you are having trouble accumulating sufficient slack, think in terms of shortening your looping distance to its optimum. At least two full feed lengths of actual slack should be accumulated for each job.



55. In long feed length operations it is often impossible to accumulate two feed lengths of slack at conventional stock line heights. Digging a looping pit in the floor to gain a larger drop in the looping area can answer these problems. The depth of the pit can be readily calculated when application specifications are made know.

56. People tend to rebel at digging holes in the floor if it can possibly be avoided. You can see where elevating the stock line height would serve the same purpose. While elevating the press is often impractical, some gain can be made by elevating the stock line height of the

straightener alone, either at manufacture or as a field modification. Remember, however, stability and security, and adjustability and serviceability.

57. In today's higher speed stamping world, certain combinations of strokes per minute and feed length are playing havoc with the control of the free loop. The material tends to bounce and vibrate erratically producing false control signals which recycle units too frequently or destroy feed accuracies. Some people have relieved such conditions by simply applying appropriate counter weights to the free loop of material.

58. Spring-loaded dampeners applied either to loop control arms or direct to slack material have effectively reduced bouncing in other cases. Most any of these devices have to be field applied to cover the very specific set of circumstances which produces a very unique set of conditions.

59. One of the most unique and effective means of dampening material in the most severe conditions is a series of "mud flaps" draped over the material at both ends of the loop. In one application it was found that a single flap took out 50% of vibration, a second flap overlapped like a shingle built the reduction to 75%, and by the fourth flap the bouncing was reduced by 90%. Such an approach is generally used in conjunction with cascade type supports under the stock at the exit of the straightener and entrance of the feed.

60. A fairly new approach which bears watching is using magnetized support cascades at both ends of the free loop. Both sheet metal style and idler rolls of the magnetized conveyor type show some promise quelling the bouncing of material.

61. Using automatically variable speed drives (such as eddy current, D.C. and hydraulic) improves control of the free loop significantly. Recycling is at the least reduced and at the best eliminated. Gradual acceleration and deceleration replaces stop to full speed to stop.

62. Automatically variable speed units can be equipped with a "creep speed" mode so that material does not stop in the straightener even during momentary line shutdowns. Material stopped in a straightener will show distinct "stop marks" which can be unacceptable to bright finish or painted parts.

63. Speed has traditionally been controlled by rider arms and more recently by electric eyes. It can now also be controlled by low voltage probes, a high speed at the top probe, low speed in the middle and stop at the bottom. This provides a ready visual setting of loop limits without the weight of a loop arm or expense and sensitivity of electric eyes.

64. It is always smart to install a minimum loop shut off provision in any loop control. This device is wired to the press to shut off before the material becomes taut, as it is practically bound to do at some time in any operation no matter how careful the adjustments and sophisticated the controls. The savings in potential die or parts damage could pay for the provision the first time it is needed.

65. In automatically variable speed operations it is a practical necessity to have an excessive loop shutoff provision. Otherwise a pile of spaghetti greets the operator returning from the men's room the first time he forgets the straightener was adjusted to run continually even though he shut down the press.

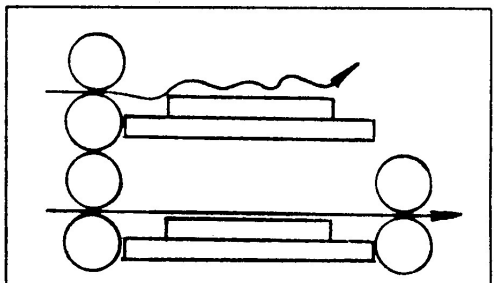
VII. If we have the free loop of material under proper control, we are now ready to concentrate on the feeding process. Here are a few points to consider.

66. To simplify matters there are only two basic types of feed to consider. First of all, the slide type feed is thought of as the slower speed, higher accuracy type. It can be mechanical (taking the power off the press) or powered pneumatically, hydraulically, or electrically. The roll type feed is thought of as the higher speed type unit in general, and can also be mechanical or powered.

67. Air feeds are thought of as the most versatile type, having the ready ability to be mounted at either side, front or back of the press. This versatility, along with relatively low initial cost makes them popular in the shorter run job shop type operations.

68. The mechanical roll feed has lower marking tendencies than a grip type feed, and its relatively low maintenance requirements suit it well to long run, high production requirements.

69. Double roll feeds have the ability to push into the die and pull out of the die, so strip material can be fed to full length. They can also be set to apply the proper amount of tension to relatively thin materials so they remain straight and level in the die.



#68 — DOUBLE ROLL FEEDS CAN HANDLE THIN STOCK.

70. If stock has to be lubricated for the stamping operation, it is always advisable to perform lubrication after the feed so that it does not contribute to slippage and inaccuracy.

71. Sometimes, stock is prelubricated or has a slick pre-finish such as galvanized. In many cases, simply sand-blasting the feed rolls will result in adequate traction to overcome the slippage and inaccurate feeding that slick surfaces can cause.

72. Most roll feeds can be purchased with a so-called matte-chrome roll finish. This is essentially a shot-blasted surface, chromed over, for high traction and wearability. It can be purchased in several levels of coarseness suited to the individual application.

73. Feed rolls can also be knurled to protect extraordinary traction. It should be cautioned that this treatment may tend to mark stock and should not be used if surface finish is critical.

74. When stock is cut-off in the die obviously double roll feeds cannot be used. How then do we prevent buckling of relatively thin material in such an operation? First of all, it requires rather intricate quiding with material either sandwiched or running in grooved rails. Secondly, though, remember to feed forward only as fast as needed to beat the press stroke. It serves no purpose to feed fast, and then have the feed wait for the press.

75. If stock tends to sag between the feed and die, or outside of the gripper jaws because it is too wide, this sagging is going to interfere with the accuracy of positioning in the die. It is very simple to install roller conveyor sections (commonly called beer rollers) to avoid this problem.

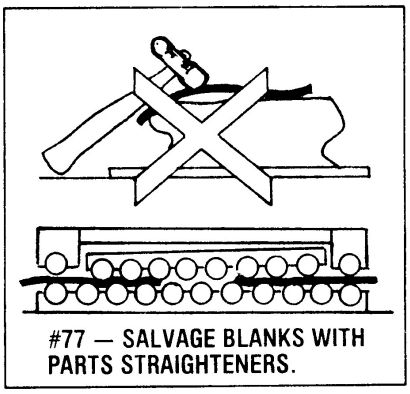
76. We commonly hear of people trying to achieve higher strokes per minute with their air feeds at shorter feed lengths. The maximum strokes per minute of air feed is pretty well restricted by its cylinder size. Yet, it is often possible to place a block in the cylinder to displace the area not being used at short lengths and thus increase the speed potential significantly. The

block should not interfere with ports or airflow and should not degenerate to be abrasive to packings. Consult the appropriate factory for assistance.

VIII. There are certain operations very closely related to uncoiling, straightening, and feeding. (The three primary functions of coil handling equipment.) It would be worthwhile to touch upon these operations since they are important in many cases to efficient coil handling processes.

77. In many cases, the slit edge of coil stock becomes an exposed edge in the finished part or assembly. Most of these cases require a processing operation at the mill or service center at a premium rate, or secondary operation after stamping to deburr or edge condition this material. It is now possible to edge condition such material right in the coil line coincident with, or directly after the uncoiling/straightening functions.

78. No matter how careful we are in selection of equipment and control of material, some parts are apt to come out of the die too out of flatness for their intended use. If the volume of these parts is significant, it is often possible to salvage them by running them through a parts straightener. Such a device will take the parts as fast as a man can feed them, certainly an improvement over a man tapping on them with a hammer.



#77 — SALVAGE BLANKS WITH PARTS STRAIGHTENERS.

79. It is always true that the ability of a line to produce is only as good as the ability to take away the finished parts. In metal stamping it is also true that the ability to remove the often bulky scrap has to be equal to the task. Chopping up this scrap reduces it to readily stored and readily moved size, which may produce a premium on the scrap market.

80. Sometimes scrap cannot be chopped in the die or even the simple ram operated type unit might offset the die load. There are crankshaft operated scrap choppers available which avoid this problem while still avoiding an external power source.

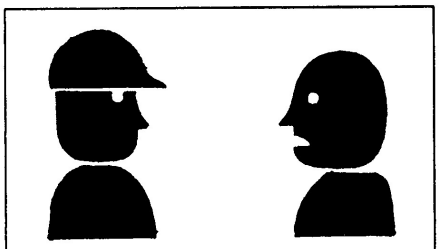
81. A free-standing, power driven scrap chopper often has the advantage of not detracting from the material position in the die. It can also be readily moved from press to press.

82. Without chopping scrap from a blanking operation it is often possible to make it readily disposable by rewinding it. In some cases this is as simple as reversing the loop control mechanism on a stock reel intended for payoff. In this way the reel turns on to take up stock when the material becomes slack, and shuts off before tautness is reached.

IX. So many problems are encountered just protecting coil stock material from marring and distortion, that it is worthwhile to devote a section of hints just to that subject.

83. Very often, in long feed length operations, there is so much material in the looping area that its very weight tends to redistort it after straightening. Simple cascade type supports positioned at the exit of the straightener and entrance of the feed can avoid this problem. They can be of sheet metal, or if abrasion is to be avoided a series of idler rolls. In either case, they should take a radium at least 360 times metal thickness. One metal stamper took a long length of the heaviest gauge he was going to run, let it take its natural drop to the floor, welded it to straightener and feed and achieved full stock support and the perfect looping distance at the same time.

84. In order to protect materials from hitting the floor or other barriers it may encounter it has become very popular to line these areas with indoor-outdoor carpeting. This long wearing relatively inexpensive material can be very effective in protecting stock. A word of warning is in order though. The front offices tend to frown upon requisitions for wall-to-wall carpeting in the press room.



#83 — "WHAT DO YOU MEAN, YOU WANT WALL-TO-WALL CARPETING IN THE PRESS-ROOM?

85. If a rider arm is distorting the material from its weight or bounding effect, perhaps low voltage probe control is the answer. Such probes simply take a touch of the stock to produce on-off signals. They operate at various safe low volt levels and can be positioned very simply to give a good visual indication of looping limits.

86. Electric eyes can also be used very effectively to control a free loop without requiring any contact with the stock. In order to avoid any false feedback from reflective stock, the eyes should either be set at an oblique angle or should be of the independent source-receiver type.

87. Both straighteners and roll feeds can be equipped with polyurethane coated rolls for protection of ultra-sensitive stock. It is necessary to keep such rolls extremely clean to prevent foreign bodies from imbedding and causing even more marking than conventional rolls.

88. By far the most popular protective roll finish is smooth chrome. Its extremely smooth finish discourages the nicking up of foreign bodies. Its hard surface produces excellent wearability and resistance to corrosion even by industrial cleaning agents. It may be detrimental to good roll traction if that is a prime consideration.

89. In discussing the protection of material we should take time to stress one very basic fact. Feed rolls are advantageous over grippers on sensitive stock.

X. At this point we are well on our way home through our 101 tips, and we reach a series of hints which, while difficult to categorize, can be extremely useful.

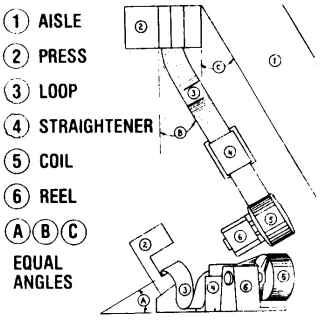
90. Remember that 80% of maintenance begins at set up. Make sure your set up personnel are thoroughly familiar with instruction manuals. Correct faulty techniques as soon as noted. Seek out the causes of maintenance problems and correct them before they become more serious.

91. Nearly all adjustments on coil handling equipment can be thought of as pressure adjustments. Stress that the minimum pressure to do a job is the correct setting for that job. Adjust pressure up gradually until the right results are achieved. Do not fall into the common trap of over-adjusting practically everything which only shortens equipment life.

92. Develop among your personnel the habit of conducting continual audio-visual inspection. We are all aware of the fact that we become so familiar with our cars that the slightest change in sound or performance alerts us to an existing or impending problem. While press shops are an unavoidably noisy environment certain unusual sights and sounds will still stand out and should alert us to a problem and be investigated before it becomes more serious and costly.

93. Coil handling equipment utilizes a series of edge guides which are just that, guides not barriers. They are no substitute for proper alignment of equipment with your dies. Continual overrunning of guides points to an alignment problem. Do not strengthen the guides, correct the alignment. Overuse of edge guides will only introduce new problems such as stock with camber or scalloped edges, or damaged equipment.

94. Feeding inclined presses with coil stock has always been a bug-a-boo, particularly with wider materials. Resulting twisted stock along with misfeeds and other problems has led many to abandon such a combination. It doesn't have to be such a problem. Positioning the coil equipment toward the front of the press the same number of degrees as the press is inclined (but still on the horizontal) will leave the material horizontal at the straightener exit, horizontal at the floor and perfectly parallel to the inclined feed and die, with all side stresses removed.



#93 — TYPICAL ARRANGEMENT OF COIL LINE WITH INCLINED PRESS.

95. Some stampers have sacrificed using coil equipment because of availability of cheaper secondary materials in strip and sheet. Others have sacrificed a great deal of production time using cheaper secondary material in coil. There is no argument with producing the needed results by the most economical means, but evaluate such choices carefully. Remember that 4 cents a pound material savings may prove a substitute for a 25% or even 100% production improvement. If poor materials are hampering your production evaluate what you might achieve using prime materials.

96. If you are blanking one circle out of a strip you could recognize a 7% material savings blanking 2 across or up to 13% at 4 across. Is this a feasibility in your operation? In some cases the wider material is run through the same die, then rewound and run again down the other side. Other plants use an oscillating feed to position first one side then the other into the die, particularly in transfer press operations.

97. In shifting from hand fed operations to coil fed, there is more than the change of thinking involved that many of our previous tips have hinted at. The chances of using previous dies without significant modification are remote. Guides and strippers must accept the automatic positioning. Pilots should be used to eliminate potential progressive error where appropriate.

98. Since coil lines can extend over a significant area, it may be most convenient to have certain of the coil equipment controls installed at a station readily accessible to the press operator. Redundant remote convenience stations are not common in coil lines. Neither are central control stations incorporating all operator controls in a single conveniently located console.

99. It is worthwhile to set for your operators the goal of keeping the uncoiling and straightening equipment continually running. Any recycling is more energy consuming than continually running. Too frequent recycling can be damaging to equipment. Most variable speed units with loop controls can be adjusted to approximate continual running. In many cases this simply means slowing them down without any detraction from production.

100. The trailing edge of coil can leave the stock reel or straightener with rather devastating effects on anything in its way. Tow motors also have a tendency to do away with things whether they are nailed down or not. There are areas of coil equipment such as loop control devices and

control stations which cannot be as effectively protected by the builder as they can once positioned for use. The simple and inexpensive installation of channel iron rails around such devices can save a great deal of maintenance cost and downtime.

101. Also because of the wide variety of installation requirements it is impossible for the builder to furnish full personnel guarding for the operating area. Examine your installations carefully. None of us want accidents from the standpoint of pure human concern, but the ability to prevent many of them with relatively simple and effective barriers and signs is a small price to pay against their economic and social costs.

102. In the final analysis, no other tip is as important to the productive use of your equipment as keeping your personnel well informed in its use. Make sure all personnel associated with the equipment are thoroughly familiar with the instruction manuals. Some coil equipment manufacturers conduct seminars, refional and in plant, directed at various personnel levels. Keep your supervisory and operator level personnel fully informed.