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Press Operator's Manual

In this book you will learn how to solve some of your pressure sensitive die cutting issues. We will help you troubleshoot your way to a productive day.

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VISUAL INSPECTION OF THE ROLLS OF MATERIAL

Prior to converting any material on press, inspections must be performed to identify if there are any defects in the material that will cause problem.

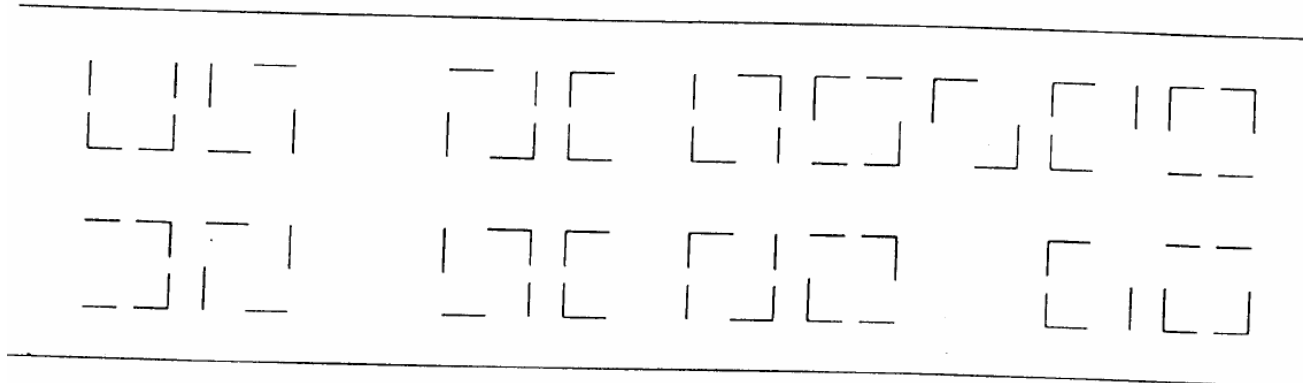
1. Inspect the outer slit edges of each roll. A smooth, clean, undamaged edge is required. Look for rough edges, gouges or other damage that may have occurred during shipment or storage.
2. Inspect for small hairline fractures in the facestock and liner along the edges. These fractures expose fibers that can lock in the adhesive and cause problems.
3. Take a 3-4 foot length of material and separate it by hand. Look for edges or areas that do not separate smoothly and uniformly. Judge whether the release feels normal or tighter than normal. Keep in mind the lighter weight the facestock the tighter the release will feel. Experience will determine if the release you feel could cause potential problem.

VISUAL INSPECTION OF THE DIE AND ANVIL

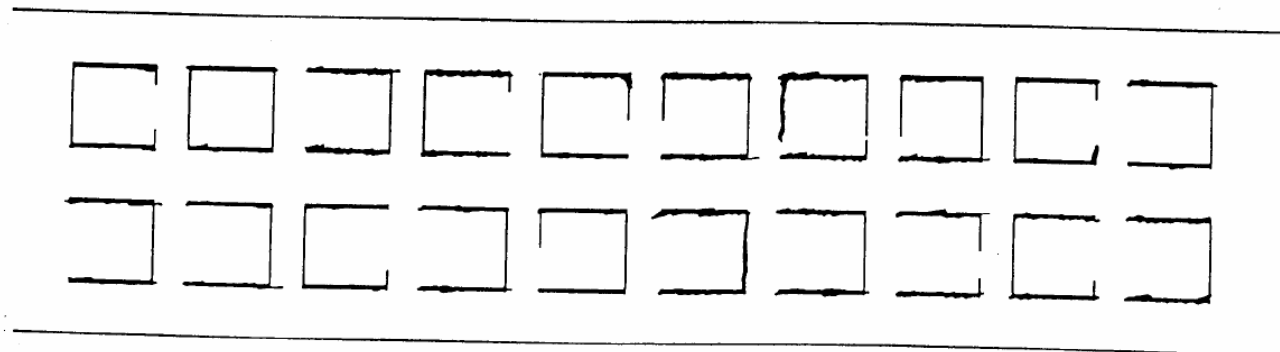
1. Inspect the die closely before you load it into the press. Look for nicks, flat spots, and wear on the blades. The die may have performed satisfactorily when last used, but could have been damaged during handling or storage.
2. Inspect the anvil roll making sure it is clean from adhesive, particles, or any debris.

INK STAIN THE RELEASE LINER

1. No outline or a light, irregular outline may indicate worn blades or improper die clearance.



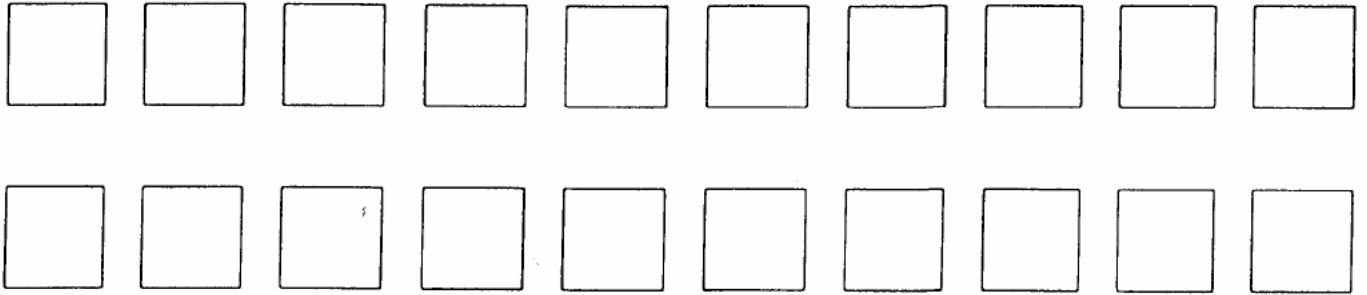
2. Penetration of the ink through the liner to the non-silicone side indicates high spots on the die; improper die clearance, dirt on the anvil, or excessive pressure on the die.



** The two major die cutting problems that are encountered on press are waste matrix breakage and lifting labels. Both of these problems can be the result of improper impression into the liner. Ink staining the liner is the reliable test to evaluate the depth and uniformity of the impression of the die cut into the release liner.

Ink staining the liner involves using a felt tip marker or diluted ink which is applied to the silicone side of the release liner after die cut labels have been removed. After the excess ink has been wiped off, what you see will indicate the depth and uniformity of the impression.

3. An even, light outline with no bleed through the silicone indicates a proper impression.



If ink staining the liner shows the proper impression, other methods should be tried to address the problems of waste matrix breakage and lifting labels.

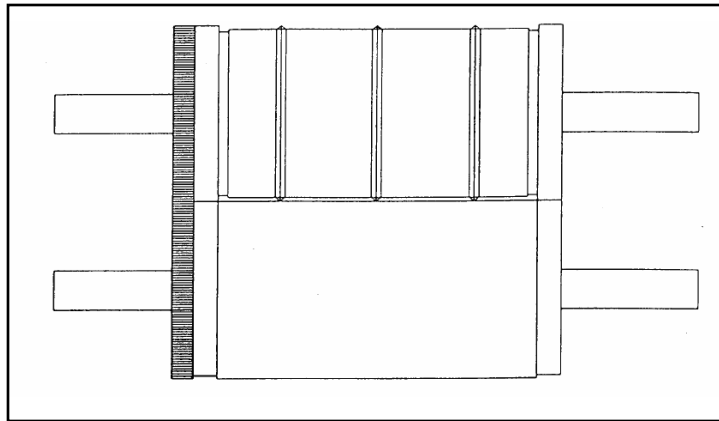


STEPPED ANVIL ROLLS

A stepped anvil is a roll that either has the center area larger in diameter so the die cuts deeper (center stepped up), or the center area is smaller in diameter than the bearers (center stepped down) to make the die cut less deeply.

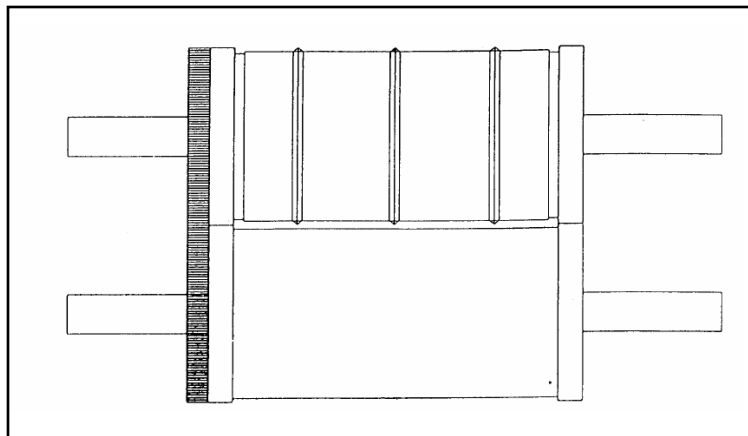
Center Stepped Up

By using a center stepped up anvil roll; you can move the cutting blades closer to the anvil roll.



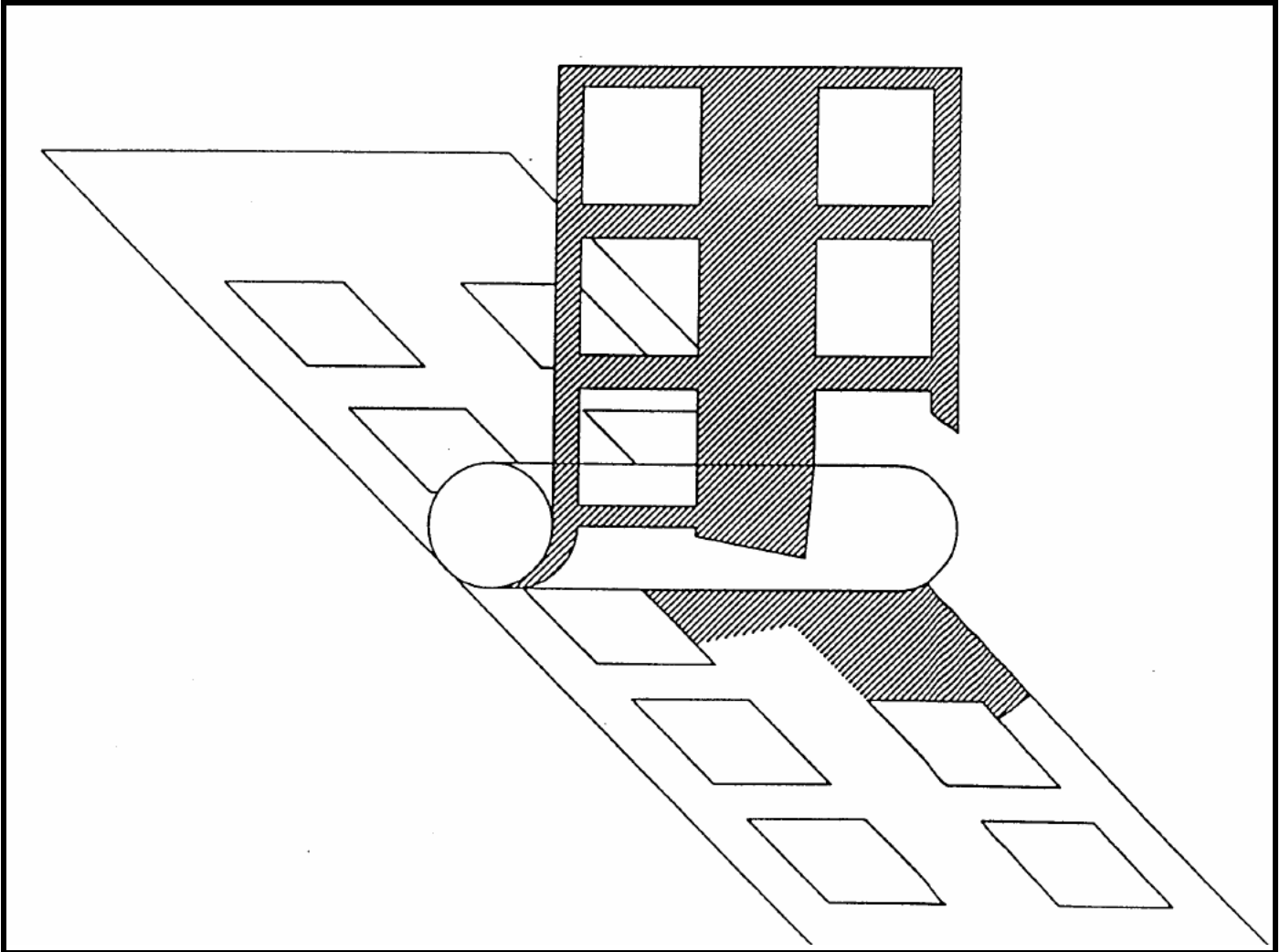
Center Stepped Down

By using a center stepped down anvil roll, the material is moved away from the cutting blades, thus allowing more clearance for a heavier liner.



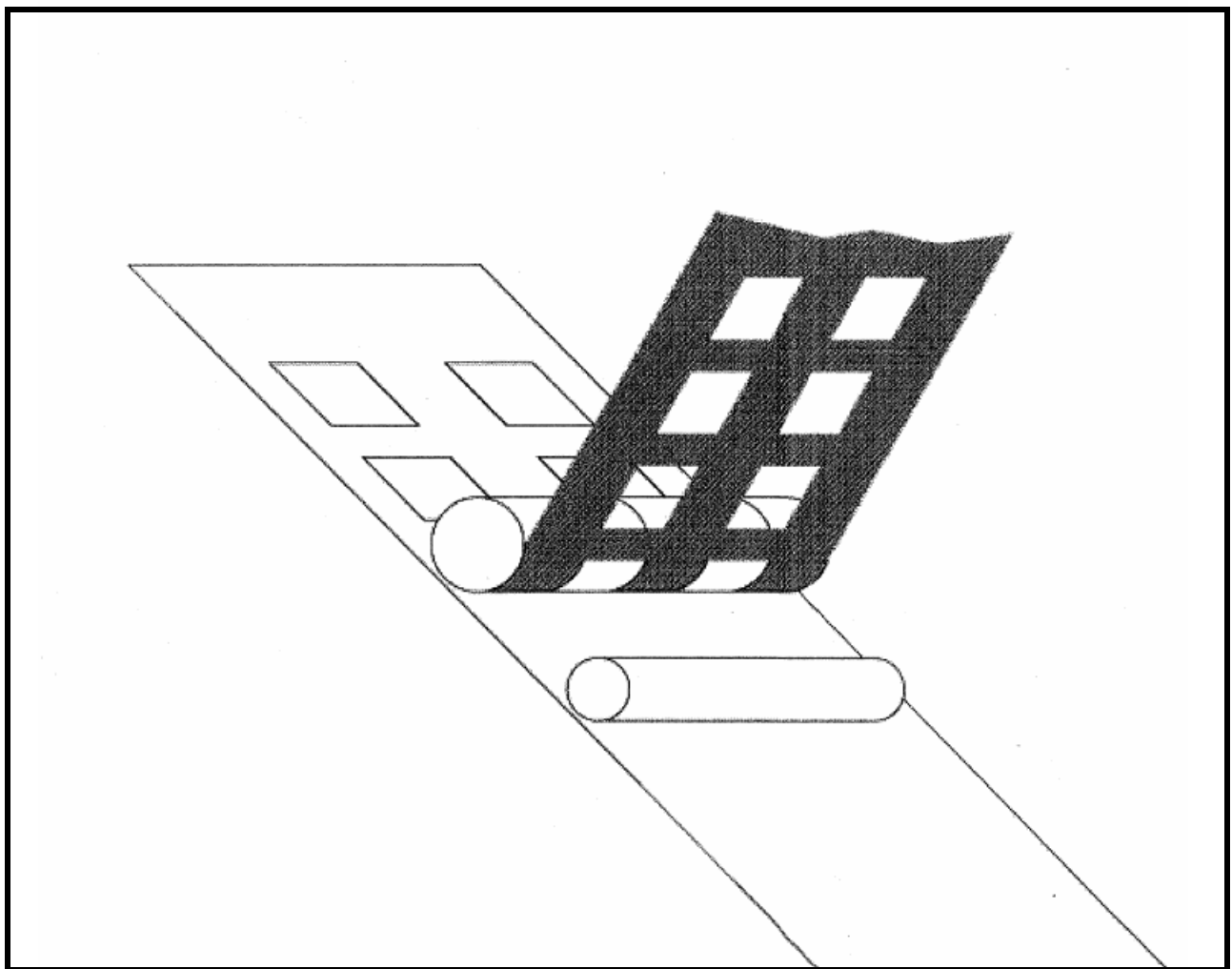
Stepped anvil rolls are to be used for pressure sensitive materials only.
Never use a center stepped up anvil on dies tooled to cut metal to metal.

WASTE MATRIX BREAKAGE



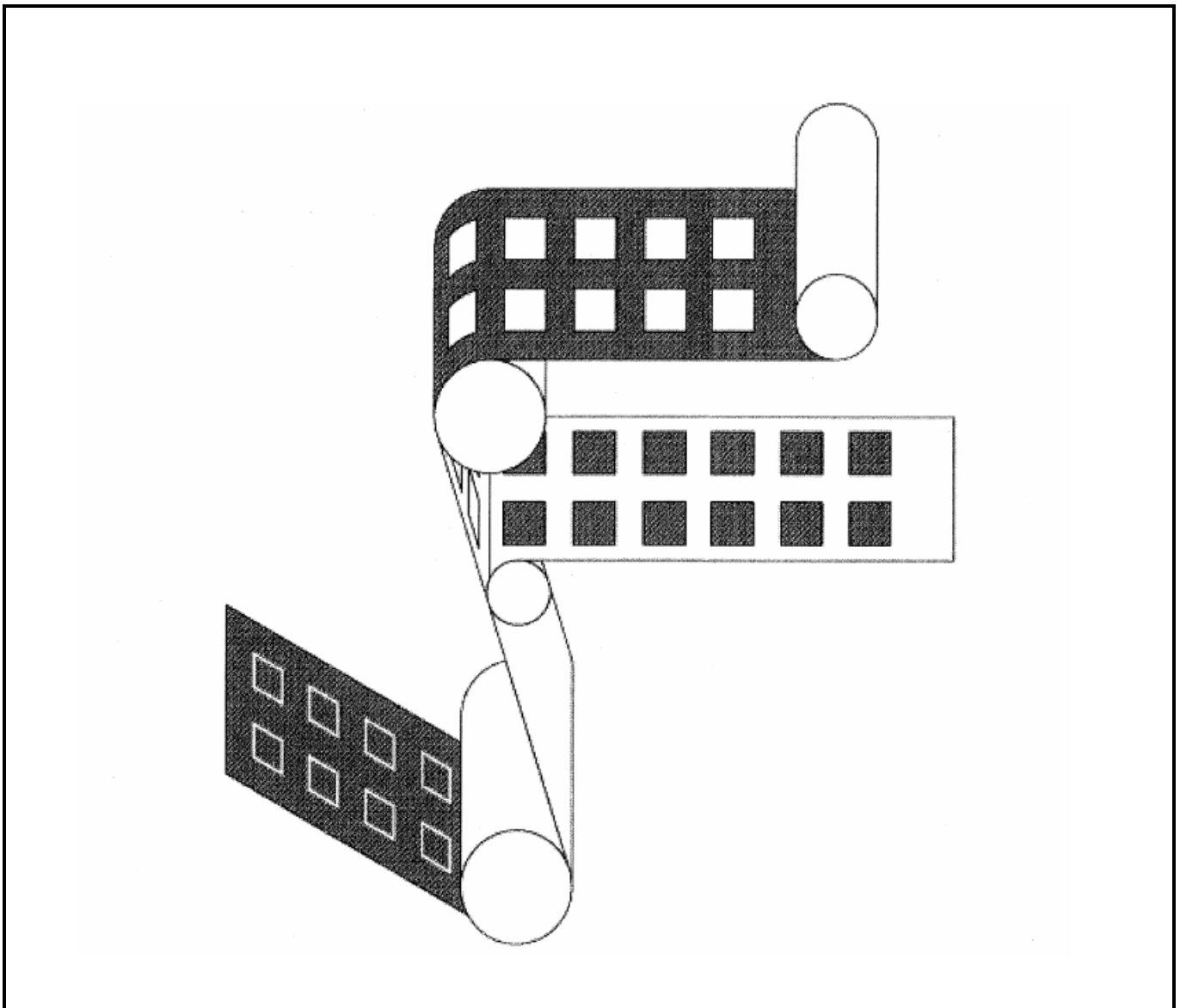
STRIPPING DIRECTLY OFF THE DIE

Try stripping the waste matrix directly after the die and before any stripping rollers. This cuts and strips the label simultaneously, eliminating any time for adhesive flow back problems. If you also pack the inside of the cavity with foam, the label is held down on the liner as you strip the waste.



DISPENSING THE MATRIX

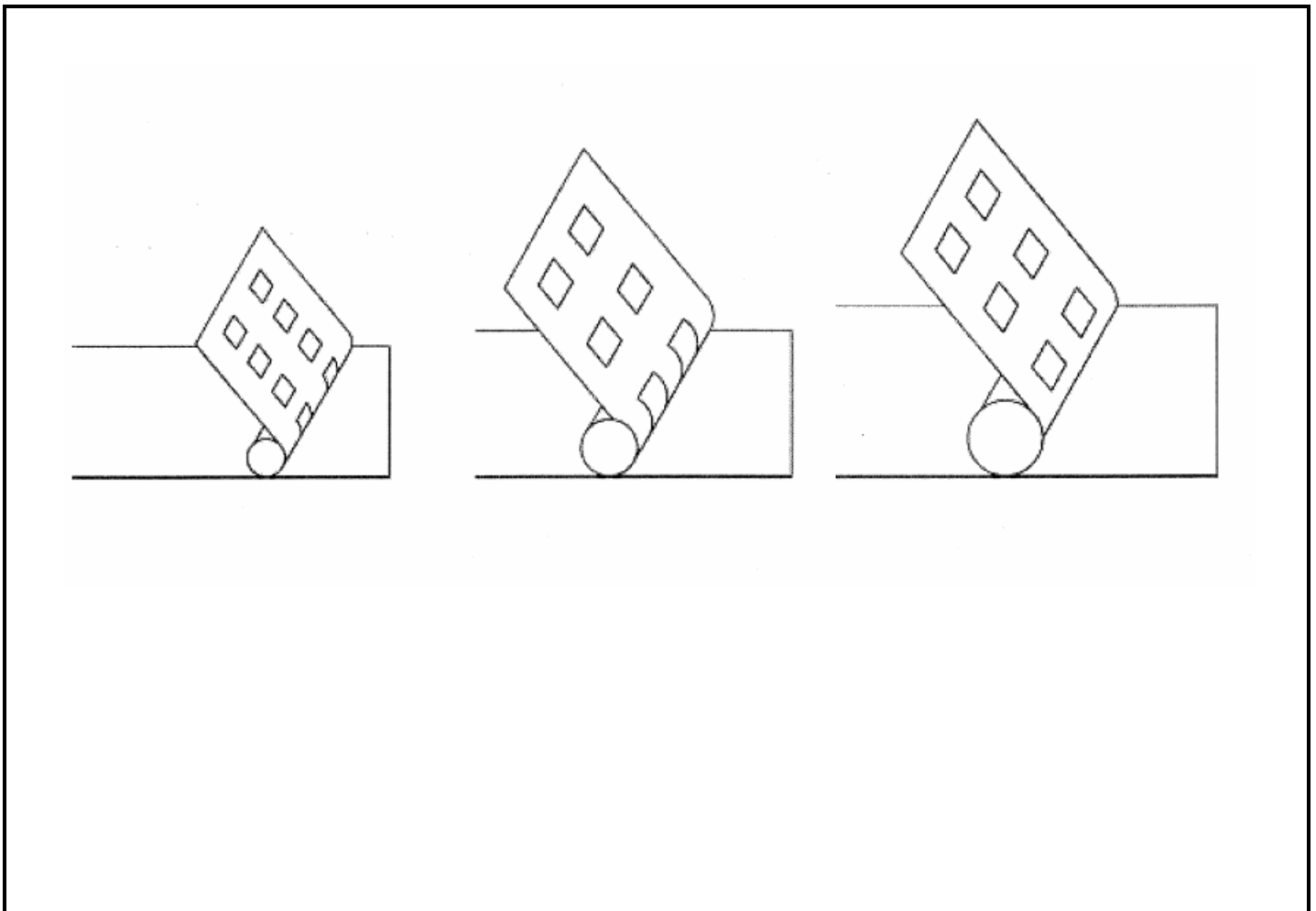
Another method to improve stripping is a technique called “dispensing the matrix”. By re-threading the web through the press, the label is separated from the waste instead of the waste being pulled up from the label as in the normal stripping process. Eliminating the angle on the matrix while separating may reduce the tendency for it to break.



CHANGING STRIPPING ROLLER DIAMETER

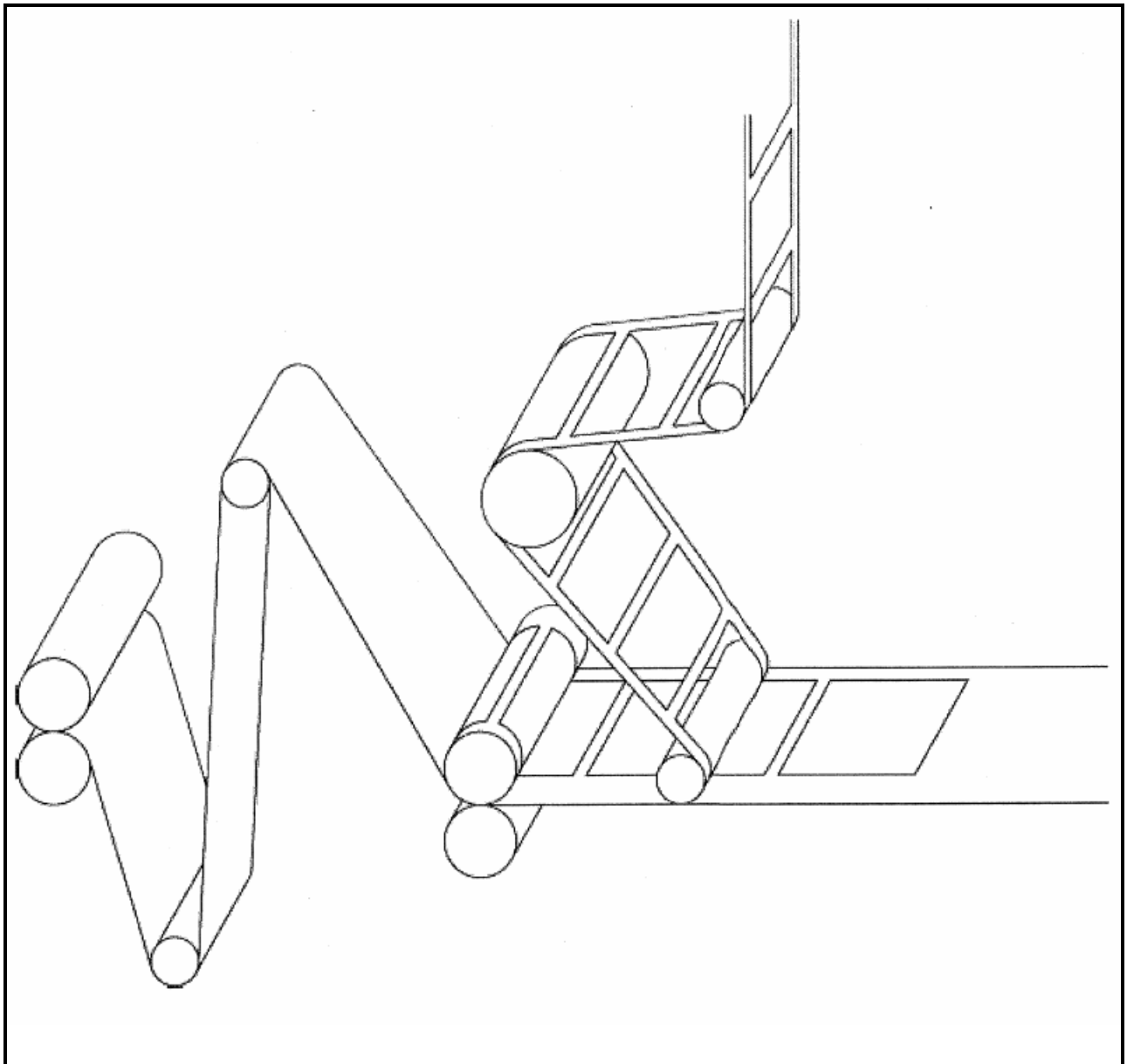
Another technique when encountering waste matrix breakage is to increase the diameter of the stripping rollers. The larger diameter stripping roller provides additional support to the waste ladder as it is separated from the facestock.

Stripping rollers can also be positioned to different heights off the web and possibly at different angles to the web to solve waste matrix breakage.



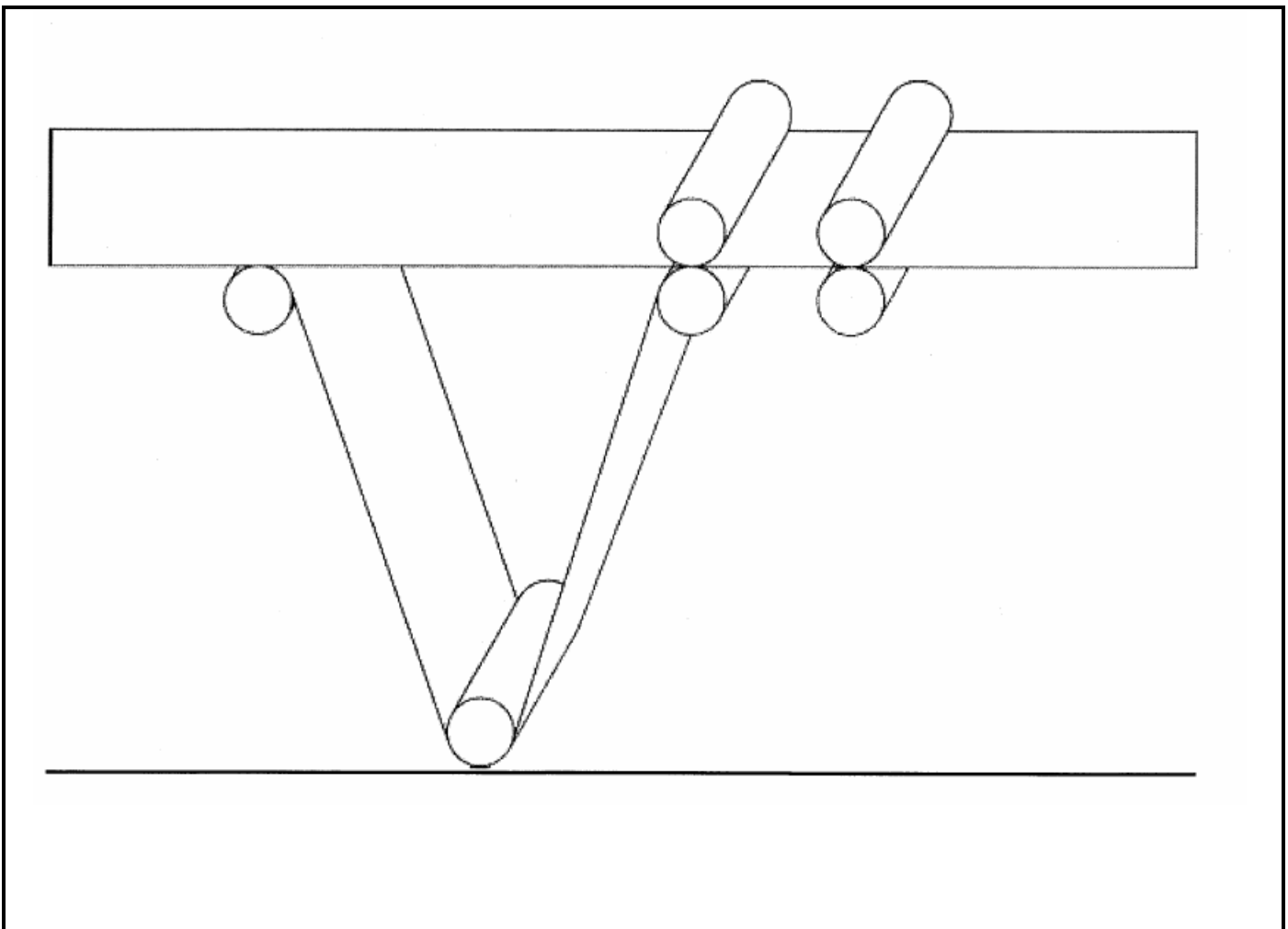
Z-BREAK

Another approach to solving waste ladder breakage is to attempt to break down the release of the adhesive prior to die cutting. The Z BREAK is the technique of flexing the pressure sensitive material around two 180 degree curves which may result in the material separating more easily when stripping waste after die cutting.



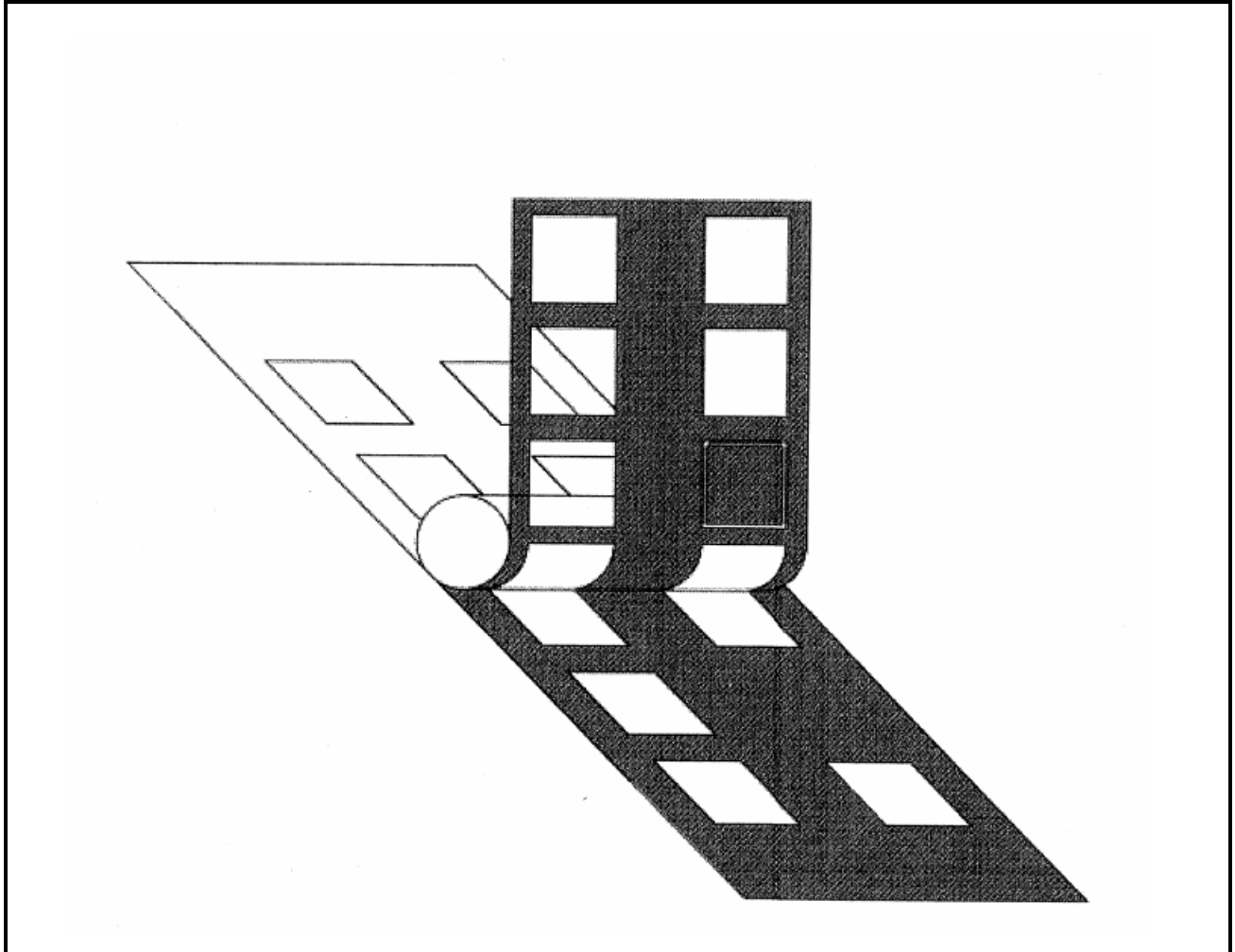
DELAM AND RELAM

Another technique that can reduce the release level of pressure sensitive material is called “de-lam and re-lam”. This process involves totally separating the liner and facestock prior to the die cutting station. This reduces the release significantly at the time of the die cutting allowing for the waste matrix to be removed with much less resistance and breakage.



TROUBLESHOOTING

LABELS ATTACHED TO WASTE



Another common problem encountered while converting pressure sensitive material is labels that remain in the waste after it has been separated from the liner. This problem is less common than waste matrix breakage, but the following techniques can help to eliminate labels going up with the waste.

- Ink stain the liner. If a light die impression is evident, a center step up anvil roll should be considered to obtain the correct die impression. Incomplete cutting of the adhesive could be the cause of the lifting labels.
- Pack the cavities with pressure sensitive foam, especially when very small labels are being die cut. Due to the small amount of adhesive contacting the liner, the labels have a tendency to remain with the waste. By packing the insides of the cavities, the labels is forced back down onto the liner after being cut.
- Try stripping directly off the die. This minimizes any adhesive flow-back problems.
- Install the smallest diameter stripping roller available. This separates the waste from the liner at a sharper angle, helping the label stay down with the liner.
- Warp the stripping roller with tape in the label areas. The increased diameter in the taped areas act as a finger to push the label out and hold it down as the waste is stripping away.
- Shut off all unnecessary press heat. Heat has a tendency to lower release and cause labels to lift.
- Increase press speed.
- Labels often lift at slow press speeds. At increased speed, a faster separation of waste from liner occurs and reduces labels going up with the waste.

TROUBLESHOOTING PRESSURE SENSITIVE DIECUTTING

Problem: Labels go up with waste repeatedly

Check:

- Die strike impression on the liner, die clearance incorrect
- Liner thickness may be incorrect
- Die blades may be dull
- Web running under the bearers
- Adhesive stringing
- Insufficient pressure, die bouncing

Problem: Label go up with waste intermittently

Check:

- Blades on single cavity for wear
- Anvil roll for defects for damage
- Liner thickness for irregularities
- Insufficient pressure, die bouncing
- Dirty die gear or bearer
- Liner release too light
- Pack die cavities
- Lubrication

Problem: Waste matrix breaks repeatedly

Check:

- Blades on die for wear
- Bad layout of cavities, not enough space between cavities, web direction
- Dirty bearers or die gear
- Too tight release
- Change stripping roll diameter and angle
- Lack of pressure, die bouncing
- Die or anvil bowing
- Worn bearings

Problem: Waste matrix breaks intermittently

Check:

- Tension on waste rewind
- Irregularities in liner thickness
- Voids in silicone release
- Splices
- Worn bearings

Problem: Die cutting through liner

Check:

- Liner thickness may be incorrect
- Blades on die are dull
- Bearers on die are worn
- Pressure on die too high
- Wrong anvil roll being used

Problem: Excessive bearer wear or damage

Check:

- Bearer wipers for lubrication
- Excessive pressure on die
- Incorrect position of hold down over bearers
- Hold down bearing failure

Problem: Excessive die blade wear

Check:

- Stock extremely abrasive or abrasive ink
- Wrong anvil roll being used

Problem: Damaged die gears

Check:

- Mesh die and anvil roll gear
- Condition of anvil roll gear
- Wrong gear tooth pressure angle
- Die gear not centered properly on anvil gear

Problem: Die not in registration with printing

Check:

- Die repeat not same as print repeat
- Loose gear on print cylinder or die
- Incorrect thickness of plate and sticky back
- Web tension

Problem: Finished product wrong length

Check:

- Die gear slipping or incorrect die gear
- Die cavity dimension incorrect
- Unwind or rewind tension incorrect
- Thick material may affect product length
- Improper die cavity packing

Problem: Gear “chatter marks” on bearers

Check:

- Die not installed square to anvil roll

Problem: Scored or discolored journals

Check:

- Bad bearing in journal block
- Bent journal

TROUBLESHOOTING METAL-TO-METAL DIECUTTING

Problem: Fuzzy Cut

Check:

- Die blades are worn or damaged
- Damaged or improper anvil roll
- Excessive die pressure crushed blades
- Cutting through wet ink

Problem: Shapes hang in matrix

Check:

- Die blades are worn or damaged
- Incorrect cavity layout of difficult shape
- Improper stripping angle
- Cutting through wet ink

DIE HANDLING, MAINTENANCE, AND STORAGE

Rotary dies require careful handling, maintenance, and storage to prevent them from being damaged accidentally and to prolong their useful lives. The following procedures are recommended:

CARE AND HANDLING ON PRESS

- No rings or other jewelry should be worn on the hands that could touch the cutting blades
- At press side, use “V blocks” to support the dies instead of lying directly on workbench top.
- Use a hoist on large or heavy dies to avoid accidental damage when installing/removing dies from press
- When possible, keep die wrapped in bubble wrap for additional protection.
- Do not set loose object, razor blades, scales, etc. on the press for they could fall onto the web and cause damage to the die.
- Lubrication is vital. Make sure gear and journal blocks are greased, and bearer wipers are properly positioned and saturated with an oil mixture. (A good recommendation is an equal mix of premium synthetic oil and oil treatment such as Slick 50.) Replace bearer wipers if necessary.
- After a die has run for a few rolls and is warmed up, re-adjust pressure so die cuts with the lightest pressure possible.
- When the press is shut off for extended periods, the pressure on the die should be released and re-set when starting back up.
- Make certain the hold down bearings are both positioned directly over the bearers of the die. Failure to check this could result in the bearings being accidentally set over blades and mashing them.

DIE MAINTENANCE, STORAGE, AND SHIPPING

- The area where dies are stored should be away from moisture and temperature variations. Avoid cold areas or areas of high humidity for these conditions can cause rust.
- Before storing a die, clean the die and gear of any residue and apply a thin coat of oil. Wrap the die in bubble wrap or protective foam
- Store the die in the box that it was originally shipped in. Make sure that the die is supported on blocks and the lid is secure.
- Do not attempt to repair or sharpen the dies yourself. Send them back to your die supplier for retooling. Include completed retool work order form describing problem or reason for retooling.

- When shipping a die to be retooled, use the same container in which it was sent. If it is a large die, make sure it is secured with wooden/plastic journal blocks, the lid secured, and the crate is banded in both directions. Pack the die to withstand extremely rough handling, regardless of the courier.
- When shipping, only pack one die per container

TOOLING DOCUMENTATION

Documenting the performance of your rotary dies can provide useful information. Keeping a record of the revolutions ran on the die can give an indication of when the die may be in need of retooling.

Records should include the following:

- Material for which the die was tooled
- Dates die was run and number of revolutions
- Dates of any retools and why retool was needed

If there are any questions about issues you are having don't hesitate to contact a Lederle sales representative. We are here to help you accomplish your die cutting problems.

Toll Free: 800-433-2106

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Glossary Of Terms

A

ADHESIVE, PERMANENT: An adhesive displaying relatively high ultimate adhesion. Generally it is not removable. It can only be removed when the degree of force overcomes its bounding ability.

ADHESIVE, PRESSURE SENSITIVE: An adhesive that is aggressively tacky at room temperature when dry. It can help create a bond to dissimilar surfaces on contact with pressure.

ADHESIVE, REMOVABLE: An adhesive that characterizes high cohesive strength and low ultimate adhesion. From most surfaces it can be easily removed.

ANVIL: A hardened steel roll that the bearers of a rotary die cutter use for support. Also referred to as the base roll.

B

BEARER: Supports that are placed or machined around the end of each printing plate to assist part of the impression load and to eliminate bounce. On a rotary die they are also the load-bearing surface usually found at each end of the tool.

BEARING BLOCK: A part that holds the rotary die in position in the die station.

BLEED: The print that covers past the die cut edge of the label.

BLOCKING: Surface to surface sticking due to adhesive ooze, wet ink or improper curing of coating.

BUTT CUT LABELS: Continuous rectangular labels formed by a single knife cut across the web.

BUTTED RECTANGLES: Rectangles that are die cut with no matrix between labels.

C

CALIPER: The thickness of paper, sometimes referred to in mils (thousandths of an inch).

CAVITY: Each single shape that is engraved on a rotary tool.

CLAY COATED: a term used to refer to paper that has been coated on one or both sides with clay coating.

CONVERTER: A manufacturer that uses rolls of films, foil, and paper to produce printed and plain rolls, sheets, parts, etc....

CORNER RADIUS: It is the arc of the union of two blades.

CRUSH CUT: A rotary blade cut that is in contact with the anvil.

D

DELAMINATION: Separating the layers of a material parallel to the surface. The partial or complete separation of laminate layers.

DIE: A tool used in converting machinery to make a pressure sensitive, metal-to-metal, or embossing cut to various materials.

DIE ADAPTER: A device that is used to allow a die station to accommodate tools originally manufactured for a different press.

DIE CUT: To cut labels with a die.

DIE LIFE: The length of run expected from a new die or a retooled die.

DIE LINES: Computer generated drawings that display the die cut shapes and layout on mylar or acetate.

DYE STAIN TEST: A test that is performed by using a diluted ink and applying it to the backing or liner material to check the die strike.

E

EDP (Electronic Data Processing): Pressure sensitive labels that are usually blank. They are used on computer-printing equipment. It is common to have the webs perforated, fanfolded, and hole punched for pinwheel feeding.

EMBOSSING: A process that dies create a relief image texture. It is common to use a two-die set to produce this effect.

ENGRAVING: A process that usually refers to any pattern that has been cut into the surface.

F

FACE MATERIAL: A paper, film, fabric, laminate, or foil material that can be bonded to an adhesive layer and become a pressure sensitive stock.

FACE SLIT: A cut in the face material of a pressure sensitive product.

FAN FOLD: Labels that are manufactured from a continuous web of label stock and are folded. They are commonly used for data processing.

FEED SLOTS: Labels that are manufactured from a continuous webs of label stock and are folded. They are commonly used for data processing.

FLEXIBLE DIE: A thin steel cutting plate that is flexible and holds on to a base cylinder magnetically.

FLEXOGRAPHIC PRINTING: A method of rotary printing that uses flexible, raised relief image plates and rapid-drying inks.

FLEXING: A condition that can occur when a rotary die is less in circumference than in the width of cross blades. This causes the center of the cross blades to cut inconsistently.

FLOOD COAT: To cover the entire surface with ink, coating, adhesive, etc...

FLUORESCENT PAPER: paper that is coated with a fluorescent pigment. Commonly referred to as dayglo. This is abrasive material.

FOIL PAPER LAMINATE: A foil that is laminated to a sheet of paper and is used as a face stock.

FOUR COLOR PROCESS: Printing with yellow, magenta and cyan inks plus black and using screens to create all other colors.

G

GEAR CHART: A reference chart that contains various print lengths that can be obtained with different gearing systems.

GEAR MARKS: Printing defects of flexo. It usually appears as uniformly spaced, lateral variations in tone that correspond to the distance between gear teeth.

GLOSS: The surface of certain materials that cause it to reflect light at certain angles.

H

HANG TAG: A description for fold-over labels that are used for product identification, this tag is usually used to “hang” on a product.

HARDNESS: This is usually measured by two scales- Shore and Rockwell.

HEAT SEAL LABELS: A type of label paper that melts a coating when heated to form a bond.

I

ID: Inside Diameter

IDLER ROLL: A non-driven roller used on converting machines to support and direct the web through a machine.

IMPRESSION: The image that is transferred from the printing plate to the substrate.

IMPRESSION CYLINDER: The cylinder on a printing press, which the material feeds over to pick up an image from the inked plate.

IN-LINE PRESS: A press coupled to another operation such as sheeting, die-cutting, stacking, etc... A multi-color press in which the print stations are connected horizontally in line.

INFEED NIP: a mechanism designed to control the forward travel of the web into the press.

J

JOURNALS: The end shafts on which a roll rotates.

K

KISS CUT: A die strike in which the tool cuts through the face sheet to a liner but not through the liner.

L

LABEL: The portion of a pressure sensitive material that is die cut into various shapes.

LABEL STOCK: Pressure sensitive substrate from which labels are produced.

LAMINATE: Material formed by bonding two or more materials together in a pressure sensitive construction.

LAMINATION: One or more material bonded together and functioning as one.

LASER PAPER: Paper that is suitable for laser printing.

LAYFLAT: A label material that has non-curling features, this material is good for processes that require a flat sheet.

LINER: This refers to the backing sheet of a pressure sensitive material. It is also referred to as the carrier.

M

MACHINE DIRECTION: The direction of the material as it moves through the press.

MAGNETIC CYLINDER: A magnetized cylinder that is used to hold flexible steel dies. It can also be used for metal backed plates.

MATRIX: The material that surrounds the die cut area.

METALIZED FILM: A plastic or film that has been coated with a thin layer of metal.

METALIZED PAPER: A lacquered C1S paper that has been coated with a very thin layer of aluminum.

MICROMETER: A mechanical device that is used to measure the thickness of a material.

MIL: A unit of measurement of thickness. It is used to describe thousandths of an inch.

N

NIP: The line of contact between two rolls. Sometimes referred to as the pull or draw rolls of web press.

O

OD: Outside Diameter

OOZE: Adhesive moving to the edge of rolls causing the ends to feel sticky. This can cause material to block.

OPERATING SIDE: The side of the label press in which printing unit adjustments are located.

OVERLAMINATE: Applying a clear film to a label stock to help protect or enhance the graphic quality.

P

PERFORATED: A series of cuts and ties to facilitate tearing along a pre-determined line or for fan folding.

PIGGYBACK: Pressure sensitive construction that consists of two release coated liners, two layers of adhesive and a face material.

PINFEED: Holes put into stock to maintain registration while they are being printed or imprinted.

PITCH DIAMETER: The measurement of a gear or cylinder, determined by dividing the circumference by Pi (3.1416)

PLATE: A carrier that contains the image to be printed

POLYESTER: A strong film that is characterized by having good resistance to moisture, solvent, oils, etc.

POLYESTER LINER: A polyester silicone release coated material. It makes an excellent die cutting surface.

POLYESTER OVERLAM: A clear polyester film coated with a clear acrylic adhesive.

POLYETHYLENE: A soft flexible film commonly used when labeling bottles.

POLYPROPYLENE: This is similar to polyethylene but is strong and has a higher temperature resistance.

POLYSTYRENE: A thermoplastic produced by the polymerization of styrene. This material is relatively unaffected by moisture. It has a great insulation properties.

PRESSURE BRIDGE: A steel support secured over die stations in which pressure screws are threaded.

PRESSURE-SENSITIVE LABEL STOCK: A combination of a face material, pressure sensitive adhesive and a release liner.

PRINT CYLINDER: A cylinder in which printing plates are mounted. Print cylinders are undercut in their diameter to accommodate the thickness of the sticky back and plate material.

R

REGISTER MARKS: Symbols used to help position the copy or die cuts to keep registration.

RELEASE: The force that is necessary to separate a pressure sensitive label from its release liner.

RELEASE LINER: The part of the pressure sensitive label stock that is the carrier.

REPEAT: The measurement of one cavity and the space between shapes.

RETOOL: To sharpen or repair a rotary tool.

ROCKWELL HARDNESS: A term used to describe the degree of the surface hardness of a substance.

ROLL LABEL: Pressure sensitive labels that are found in a continuous roll form.

ROTARY PRESS: A press that features a roll-to-roll operation.

RUNNING REGISTER: The control on the flexographic press that accurately positions the printing of each color and die station in the web direction while in the run mode.

S

SCORE: To make an impression or pressure sensitive cut in the material.

SELF-WOUND: A material that has a carrier with pressure sensitive adhesive on both sides and a single liner that is coated on both sides with a release. It can have a pressure adhesive on one side and be rolled up on itself (no liner).

SEMI-GLOSS PAPER: Litho paper that is coated on one side.

SILICONE COATING: A polymer system that acts as a good release.

SPLIT: To cut rolls of stock into specified widths.

SPLIT BACK: Slits in the release liner to help remove the label by hand

SPLIT FACE: Slits in the face stock to help remove the label from the release liner.

STACKER: A mechanical device on the end of a press that stacks sheeted labels.

STATIC CLING: A type of film that is able to adhere to a clean smooth surface without using an adhesive.

STEPPED ANVIL: An anvil that has been reduced either in the bearer or the body of the roll to cut to different depths.

STICKYBACK: Double faced adhesive coated material used for mounting printing plates to plate cylinders.

SUBSTRATE: Converters refer to it as the facce stock being printed.

T

TAGS: An identification piece that is only partially affixed to a product.

TAMPER EVIDENT LABEL: A pressure sensitive label that will partially destruct upon removal.

TENSION: Stress caused by a force to extend, stretch or pull apart.

THERMAL: The use of heat in any process.

THERMAL TRANSFER PAPER: A type of paper that will accept heat activated ink from the ribbon of a thermal transfer printing.

TIE: The uncut portion of a perforation.

TOOLING: Usually refers to the dies.

V

VINYL: Synthetic plastic products that can be in rigid or flexible form. Generally more flexible and formable than polyesters.

W

WEB: Material in the form of a roll that passes through the press.

WEB DIRECTION: The direction of the material as it moves through the press.

WEB TENSION: The amount of pull or tension applied to the web in the direction of travel.