

BOOKBINDING MADE SIMPLE!



A 'how-to' guide on
hard cover bookbinding...

*and its applications in producing photo
books for the on-demand digital industry.*



Most people engaged in the production of books (both publishing and printing) usually have less opportunity to become familiar with bookbinding than any other part of the process. The quality of a book's designs, its type, papers, and printing is fairly obvious even to a casual observer. It is not too difficult to decide whether the design is pleasing, whether the typeface is readable, whether the printing is clean and crisp. A good sheet of paper looks well to the eye and feels good to the touch. The binding, however, is completely hidden except for its cover. Its construction, good or bad is not visible. Nor is it evident that numerous operations went into its manufacture.

In this '*How-To produce hard cover books*' pamphlet, for the benefit of on-demand book publishing, photo labs and manufacturing personnel engaged in digital printing, we will look beneath the cover to see just what takes place from the time printed sheets are delivered from on-demand digital printers until the finished book is in the customer's hands. Long before composition is started, much has been decided between the book publisher, printer, and binder. Although binding is the last process in the making of a book, experienced production people know that many decisions on binding must be among the first made in the preparation stages. The binder should be consulted before these decisions are made; if not, mistakes can result that will raise the cost and often decrease the quality of the book.

In these planning stages, the binder helps decide many questions, such as:

- What size signature to sew?
- How much trim allowance to provide?
- Where and how to place special illustrative materials?
- What endpapers to use and whether they are to be plain, colored, or printed?
- What weight of board to use?
- What cover material to use?
- Will there be a die cut window?

Before starting our tour through the bookbinding process, let's examine the end product and define certain bookbinding terms.

In the ODM tour, we will be concerned with *hard cover* books: a collection of printed pages, which are sewn and placed between rigid covers. In the traditional category are textbooks, encyclopedias, trade books, directories, religious and many types of juvenile books. We will try to use these traditional examples and apply them to the new 'on-demand' coffee-table photo books.



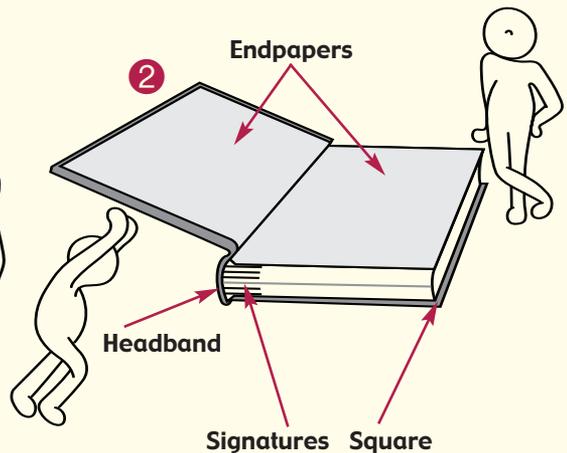
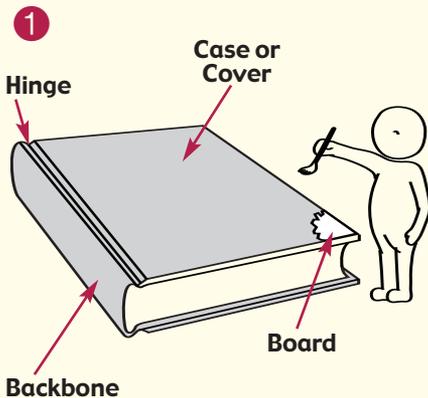
Looking at the first illustration, let's start with the outer hard cover of the book and peel it like an orange.

1 The visible part of the cover, or **case**, as the binder calls it, is the **cover material**. This is usually cloth, paper, or strong non-woven material which can either be printed before the cover is made or **decorated** by **stamping** with engraved brass **dies** after the case is completed. The cover material is glued to a **board** made of old paper fibers and rolled into a hard, firm sheet. In medieval times, boards were actually wood usually oak; although wood is no longer used, the name has persisted. Board comes in many dimensions to fit various requirements. The groove at the back of the cover forms the **hinge**, which allows free flexing of the cover. A good hinge places no strain on the book proper when the cover is opened. The connecting piece of the case, which joins the two covers and the body of the book is called the **backbone** or **spine**. This carries the title of the book and other information, and stands at "present arms" on the library shelf to beckon or repel the reader.

2 When we open the front cover, we first see the **endpaper**, which, with a similar endpaper at the back, holds the body of the book in its case. Endpapers are usually made of heavy, strong, long-fibered paper. Half of the endpaper is glued to the cover and the other half is fastened to the body, forming a two-page fly leaf. When the body of the book is mounted in the case, the covers extend slightly beyond the edges of the pages. These extensions are called **squares**. Decorative bits of colored material called **headbands** are attached to the top and bottom of the backbone. These are sometimes referred to as **head and tail bands**. At one time these were carefully crocheted by hand from several colors of silk thread, but today they are purchased in rolls of material and applied in the wink of an eye. Because of the sheet size limitations on current digital presses, most machines deliver the pages in loose sheets. This is another reason why **Smyth** sewing is not very popular in this marketplace.

These terms will enable us to start the ODM tour on 'How-To' produce **hard cover** books. More definitions will be given as we proceed and learn about the following stages:

 **SEWING
CASEMAKING
CASING-IN and
BUILDING-IN**





SEWING

The two types of sewing commonly used to bind hardcover books are *Smyth sewing* and *side sewing*. Side sewing traditionally was referred to as *Singer* or *McCain* sewing, depending on whether a Singer or a McCain side sewing machine is used. McCain equipment handles thicker books than does Singer.

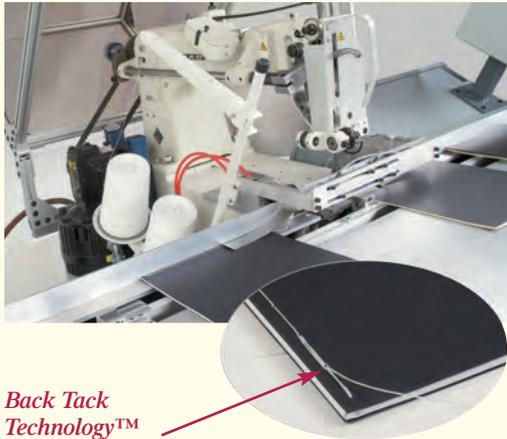
Today, On Demand Machinery has developed the **ODM Super Sewer™**, an on-demand side sewing machine that features *Back Tack Technology™*.

Simply put, the sewing machine does a reverse back stitch on the head and foot of the book block. This lock-stitch sewing ensures a very strong side sew which will not come apart at the head and foot like standard side sewn books do. **ODM Super Sewer™** can stitch up to 10 books per minute; that's 600 books per hour.



ODM Super Sewer™

<http://www.odmachinery.com/supersewer.htm>

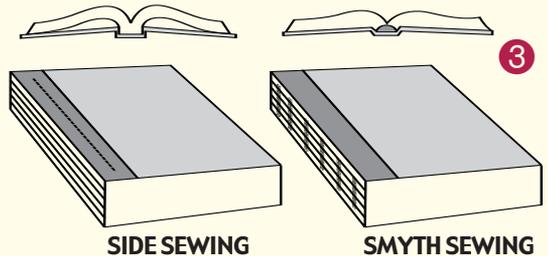


Back Tack Technology™ features a lock-stitch ensuring a strong side sew.

3 In a side-sewn book, the thread is passed through the thickness of the book from one side to the other. A Smyth binding links signatures together by passing the thread through the folded edge of each signature, from outside to inside and out again, in succession. Side sewing produces a fairly rigid binding, which offers strength and economy. Most encyclopedias and elementary textbooks and many catalogs are side sewn.

Smyth sewing provides a flexible binding which enables the book to open easily and lie flat. It is usually specified for binding text books that are composed of many multiple signatures of 8, 16 and/or 32 pages.

This Smyth sewing machine has several spools of thread in order to sew the book in several places across the back. The operator feeds signatures from a stack of gathered books one at a time into the machine, which automatically sews them in consecutive order. Controlled by foot pedals, the machine also pastes the first and last sections to the adjacent signatures and cuts the threads between books. The operators develop a rhythm of hand and foot movements that makes the observer slightly dizzy. Smyth sewing requires varying degrees of make-ready and it is not cost-effective for on-demand photo bookbinding.



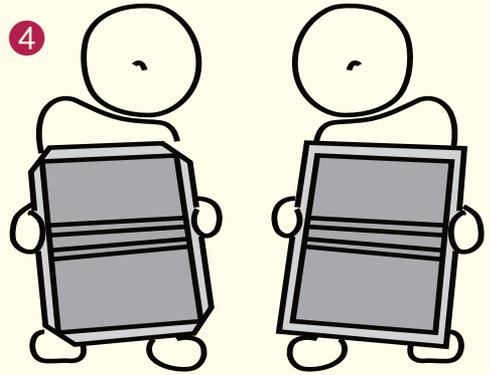
CASEMAKING

At this point in our journey, we must go back in time to see how the cover for our book was produced while the text section was moving through the printing, gathering and sewing operations. As soon as finished sewn signatures are available, a single copy of the book is rushed through ahead of the rest of the books and sent to the *casemaking* department. This advance copy is known as a case size, and is used to guide the manufacture of the covers.



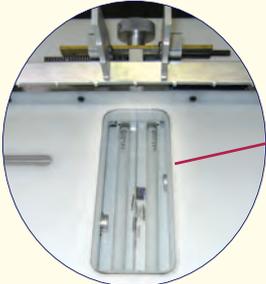
First, a sample cover is made to fit the case size copy. After approval has been secured, and an accurate estimate has been obtained of how many finished books will be produced and require covers, casemaking begins. Making just the right number of cases is important – too many or too few covers will result in either extra covers or extra books which can easily wipe out the binder’s entire profit on the job.

4 Cover material is received in rolls and boards are delivered in large sheets. Both must be cut to size for each book. Boards are cut to exact size, and material is cut with 5/8” extensions on all four sides. Glue is applied to the material and the boards are laid in place. A paper liner, the exact width of the backbone, is glued to the material between the two boards. The flaps of material extending beyond the boards and liner are turned under and glued to the inside of the case to form a finished edge.



Casemaking machines, such as the **ODM Casemaking XXL System™**, can perform these operations and produce 120 to 200 covers per hour. Never before has the hard cover binding process been so simple. ODM has broken down the process into four easy steps that are simple to master: the **Spreader**, **Slider**, **Stomper** and **Squeezer**. First cover material goes through the *Spreader*, a top side gluer. The machine eliminates the need for the operator to *flip over* the glued cover material as with traditional bottom side gluers. The *Slider* then spots and aligns hard cover boards in position with sliding table case gauge. The new built-in light box has a very specific purpose, when aligning pre-printed covers, you do not need to use the side guide. Just simply center the title on the scribed line and the type lines up perfectly on the spine. All four sides of the hard cover are turned-in with the *Stomper*. This forms a quality ‘turned-edge’ construction. The finished hard cover goes through the *Squeezer* rotary press.

Built-in light box is used to align pre-printed covers.

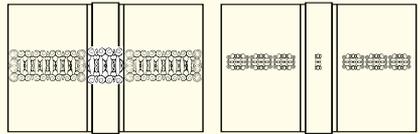


Casemaking XXL System™ produces 3x5” wallet up to 22 3/4 x 46 3/4” tabloid size hard covers.
<http://www.odmmachinery.com/casemaking.htm>

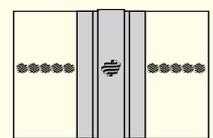
120 to 200 covers per hour!

5 Cover material may be *decorated* before the case is joined to the rest of the book. Where the decorative design is to be printed on the material, decorating can be done before or after casemaking. **Pre-printing** of cover material allows more freedom in the type of design used because the design can run from the front cover's edge completely around to the edge of the back cover. Decoration of a cover by **stamping** after manufacture, cannot bridge the gaps between the boards and liner. These two processes are sometimes combined by covering the boards with pre-printed material and adding a layer of overlapping material, which is then stamped after manufacture.

PRE-PRINTED, FOIL STAMPED and



5



THREE PIECE COVERS



Decorating after manufacture is done by **foil stamping** using engraved dies, usually of brass. Long runs may require chrome plated or steel dies. Stamping materials may include pigment foil, genuine gold, gold or aluminum foil, ink, or combinations of these. The book's title and the publisher's imprint will be stamped over this in gold foil. *Today, most of the traditional foil stamping operations can be done digitally.*

A foil stamping press applies gold foil from two ribbons the exact width of the design. After each stamping, the ribbons are moved forward. Some stamping materials, such as genuine gold are relatively expensive and care must be taken to make the most economical use of them. As many as five ribbons can be used at one time, which means five different colors can be placed on a cover in one stamping.

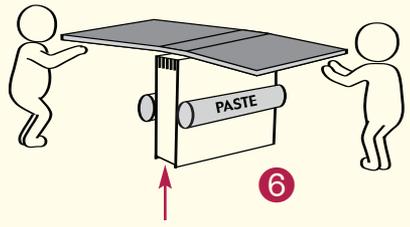
The two basic types of stamping presses are: 1. Hot Foil and 2. Platen Type Machine Stamping. 1) The die is glued to the head of the stamper, which is heated to 200 degrees or more. The foil is made of a Mylar® or acetate base, which carries a layer of genuine or imitation gold, aluminum, or pigment and a coating of size. Bringing the heated die down on the foil and cover releases the foil from the base. The heat plus the size adhere it to the cover. 2) The platen type machine is used in all binderies. It operates exactly like a platen letterpress, and can be equipped to do both hot foil and ink stamping.



CASING-IN and BUILDING-IN

The cover and body of the book come together in the final operations of book manufacturing – casing-in and building-in.

6 **Casing-in** is the process of mounting the book in the case. Each book block is fed into the **ODM Sticker™** a casing-in machine, where rollers apply paste to the endpapers and well into the joint. The operation of the Sticker™ consists of placing the book on the wing while the machine is in the home position. After the book is loaded, the operator depresses a foot switch that drops the wing below the glue rollers. A servomotor brings the two glue stations in contact with the book while the wing travels upward, applying a uniform coating of adhesive to the end papers. As the book emerges from the glue pots the operator places the cover in position with a handy cover guide and removes the book from the wing. The cover



guide is designed for accurate placement of thin covers. No make-ready time is required as the Sticker™ is self-adjusting. The glue stations are easily removed for a quick cleanup. The Sticker™ can produce 150 to 240 books per hour.

After inspection to make sure the book is mounted properly in its case, the volume must be **dried** to set the adhesion of case and book permanently. In the past, books were loaded between press boards, and heavy clamps were applied to squeeze the book and press the covers onto the pasted end-sheets. They had to be kept under this pressure for 8 to 12 hours until thoroughly dry.

ODM Sticker™ with cover guide
<http://www.odmmachinery.com/sticker.htm>



Today, a **building-in** machines achieves the same result in seconds. The **ODM Smasher™** is a self-adjusting hydraulic building-in machine. The operator places the cased-in book into the Smasher™ and depresses a foot pedal that brings the top joint iron in contact with the book. This enables the operator to accurately find the joint area of the book. After locating the joint area, two buttons are depressed that activate the hydraulic system that raises the bottom steel platen and clamps the book with 20,000 pounds of pressure. The heated joint irons aid in forming the joint by reactivating the adhesive in the joint area and softening hard cover materials such as library buckram and film laminates. The Smasher has an adjustable dwell timer that controls how long the book remains under pressure. The heated joint irons have a thermostat for varying the degree of temperature. The Smasher™ can produce 150 to 240 books per hour. The books are now complete and ready for inspection, and delivery.



ODM Smasher™
<http://www.odmmachinery.com/smasher.htm>

The age old problem of warped covers has been greatly reduced with the advent of careful seasoning of cover boards and the use of new synthetic adhesives. These special adhesives are required for the successful use of building-in machinery, which enables manufacturers to ship orders within minutes of their completion on the production line. If this problem persists, ODM developed a **cover dewarping machine** – the Straightener™ to solve the problem.

ODM Straightener™ takes warped cover boards, or covers and removes the curl that sometimes occurs during the board manufacturing process and/or, casemaking. The operator simply feeds the warped material into the machine where it is run through a three roller dewarping station. The amount of dewarping action is easily controlled with hand tightened adjustment knobs located on the top of the machine. When the boards exit the machine they come to rest in a well constructed material catching basin.

ODM Straightener™
<http://www.odmmachinery.com/straightener.htm>





As we end our tour of hard cover book-binding, it is evident what was formerly a hand-operated craft process has become largely an automatic machine system of production. While the manual effort required for producing books has diminished, the need for more knowledge of on-demand machinery and materials is increasing at an incredible pace. With this newly acquired knowledge, the digital book manufacturing industry will be able to supply hard cover books on-demand the same day for overnight delivery to their customers in this rapidly growing digital print market.



ODM Separator™ is a safe, simple machine that die cuts windows in finished hard cover books.

<http://www.odmmachinery.com/separator.htm>



The finished '*library-quality*', hard cover photo book will last for many future generations to enjoy and cherish.



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