TenonCam®

www.tenoncam.com

CNC SYSTEM

504 Greco Court • San Jacinto, CA 92582
Phone (951) 487-7680 • Fax (951) 487-7650

Q. What is TenonCam and what does it do ?

A. TenonCam is a cabinet manufacturing system, consisting of patent pending router bits and software, used to form mortise and tenon joints, in-the-nest, on a flatbed cnc router. This process is used to produce completely milled cabinet, drawer and toe board parts, without secondary operations or supporting machinery. The concept is to put a 4 x 8 sheet of material on the router, process it, and then take completely milled, cut to size parts off the router. No double handling or secondary machining is required.

Note: Occasionally, flip side operations may be required on some single partitions (i.e. mail box slots).

Q. Why was TenonCam developed ?

A. The objective was to develop a highly efficient nested based cabinet manufacturing system, utilizing a flatbed cnc router and an automatic edge bander, requiring a very small amount of floor space, to produce a superior product, at the lowest manufacturing costs, with custom flexibility, seamlessly computer driven by the design program in the office.

Q. Who developed TenonCam ?

A. TenonCam was developed by a regional custom cabinet manufacturer located in Southern California, and was initially never intended for sale. TenonCam is all practical application, no theory. It is being used, scrutinized, developed and tested daily; by real cabinet makers, in a real shop, under real woodworking conditions.

Q. What cabinet styles can TenonCam produce ?

A. TenonCam produces Frameless, Face Frame Overlay, Face Frame Inset and Face Frame Lipped cabinets, which all utilize the same construction method. The objective is to build the same cabinet carcass for all of the different cabinet styles. This makes it easy and efficient to produce any cabinet style the customer requests, while dramatically reducing employee skill levels.

Q. Can TenonCam improve our quality while reducing manufacturing costs and employee skill levels ?

A. TenonCam is the “missing link” necessary to fully utilize the potential of a flatbed cnc router. An operator can be trained in less than two weeks to run almost any flatbed cnc router, and requires no programming or woodworking knowledge. Because the cabinet, drawer and toe board parts are fully machined, an assembler requires no special skills and can be trained in less than two weeks.

Q. How safe is TenonCam in comparison to traditional cabinet manufacturing ?

A. TenonCam is safer in so far as it requires less operator exposure to milling tools and machinery. With TenonCam, a broader range of parts can be completely machined on the cnc router and therefore, fewer parts in your company’s total product line will require traditional (and potentially more dangerous) machining by highly skilled (and expensive) millmen.

Q. What advantage does the TenonCam mortise and tenon construction method have over the Dowel construction method ?

A. TenonCam requires less capital investment in machinery and floor space than dowel construction, with much less material handling.

A typical dowel construction method would utilize the following processes:
Beam Saw *transfer* Edge Bander *transfer* Point-to-Point *transfer* Horizontal Boring / Dowel Insertion *transfer* Case Clamp Assembly.

A typical TenonCam mortise and tenon construction method would utilize the following processes:
CNC Router *transfer* Edge Bander *transfer* Screw Assembly on a Work Bench. TenonCam results in improved productivity with a much better return on investment.

Q. What advantage does the TenonCam mortise and tenon construction method have over the Blind Dado construction method ?

A. Unlike the Blind Dado construction method, the TenonCam System does not require that materials be measured for thickness variation and entered into the software program. In any case, manually accounting for material thickness does not work at all when two different lots of the same material vary in thickness more than .004 of an inch, and need to be used on the same project. TenonCam eliminates the potential of costly errors, as a result of parts being produced that don't fit properly.

After assembly, a dado joint will still expose chip-out caused by machining. In contrast, after assembly, the tenon shoulders will cover up any machining chip-out.

The tenon shoulders hold the cabinet body interior horizontal opening to net size. This ensures that any material thickness variation will harmlessly go to the *outside* of the cabinet body *horizontally*. Therefore, ball bearing type, side mount drawer guides will install without shimming or shaving.

The TenonCam System produces a fully milled tenon, orientated exterior face down to the spoil board, with a fixed mortise location. Material thickness variations harmlessly go to the *inside* of the cabinet body *vertically*, automatically holding the tops and bottoms flush with the cabinet ends.

Q. What is the fastest construction method when manufacturing with cnc equipment ?

A. If you examine the total process of converting raw materials into finished product, the TenonCam cnc system is much faster than any other construction method.

Q. How does the TenonCam mortise and tenon joint compare in strength with other construction methods ?

A. TenonCam is currently going through the process of testing in accordance with the "California Earth Quake Standards". Preliminary reports indicate that TenonCam is at least as strong if not stronger than any other construction method tested. The mortise and tenon joints fit so precisely that the strength of the joint is no longer dependent upon glue, which is optional, when construction screws are used in the pilot holes provided by the TenonCam system.

Q. What is the price range and availability of the TenonCam router bits ?

A. The TenonCam router bits are under 230.00 U.S. Dollars and will last from 1 to over 450 sheets of material, depending upon the quality of the material being used (i.e. how many pieces of metal are in the core and/or how wet the core is). The TenonCam bits are available for same day shipment.

Q. Can the TenonCam router bits be sharpened ?

A. The TenonCam router bits should not be sharpened, as this changes the bits' geometry and causes more problems than it's worth. These bits are capable of an operating cost of under 0.50 cents per sheet and are intended to be thrown away when the quality of the cut becomes unacceptable.

Q. What other software must we have in order to run TenonCam ?

A. TenonCam is not "stand alone" and has been designed to operate in conjunction with the Woodworking Industries' most popular Software Packages. It is your choice as to which software package most appropriately addresses your needs.

Q. What if we want to change construction standards to meet our requirements ?

A. Although TenonCam is complete "out of the box", you still retain the ability to make changes to the construction standards to meet your requirements. TenonCam does not alter any of your design software's capability.

Q. What is the price range for the license to use the TenonCam router bits and software ?

A. Between 5,000 and 15,000 U.S. Dollars, depending upon your application and existing or intended CAD/CAM software.

Q. On average, what would be considered a reasonable payback period for TenonCam ?

A. There are so many variables, that this is a difficult question to answer, but in general, if TenonCam is used "out of the box", in a small shop with a sustained work load, TenonCam should easily pay for itself within six months. Larger shops could expect a quicker payback period.

Q. What manufacturing problems were TenonCam customers trying to solve ?

A. Increase productivity using the least amount of floor space and capital investment. Standardization of construction method with custom flexibility. A fool proof way of automatically dealing with material thickness variations. A construction method that works equally well with plywood, melamine, high pressure laminate and vinyl. Reduce employee training while improving safety. Produce Face Frame and Frameless cabinets with equal efficiency. Improve the quality of the cabinet while reducing cost.

Q. What business problems were TenonCam customers trying to correct or avoid ?

A. Some TenonCam customers had purchased a nested based cnc router and software, with the expectation of being more profitable. They had usually spent about two years and thousands of dollars trying to get their system operating correctly, but experienced less than desirable results. Other TenonCam customers had heard the standard horror story mentioned above, but still wanted to automate if they could find a way to avoid the pit falls. Then there are the TenonCam customers that just plain liked the system the moment they saw it. TenonCam is years faster and incredibly less expensive than setting up an automated system from scratch. TenonCam is the solution.

For standard "TenonCam - CNC System Plus" customers, we guarantee that TenonCam will perform as advertised and that your company will be up and running correctly within two weeks, or you don't have to purchase TenonCam.