

Laser Cutting News

Volume 1, Issue No. 1

July 2005

ORCA

Welcome!

This is the first issue of Laser Cutting News. The purpose of this newsletter is to provide you with useful information - about applications, technology, people and products. Every issue will include the series "Laser School," which will help to you to understand the basic principles behind Laser Cutting.

We always welcome reader feedback about this newsletter. Please contact us via phone or e-mail with your comments, suggestions, or concerns. Of course, we'd love to discuss your Laser Cutting application too.

To specify print or digital delivery, or to be removed from our list, just phone or e-mail with your full name, and we will change or remove your subscription immediately.

Steve Moody,
Editor

ORCA PHOTONIC SYSTEMS

14636 NE 95th Street
Redmond, WA 98052
(425) 702-8706
(888) 702-8706 (toll free)

Info@orcaphotonics.com
<http://www.laser-cutting.com>

Orca Photonic Systems Acquires Assets of Edgewise Tools, Inc.

Orca Photonics acquired the assets of Edgewise Tools, Inc. (Poulsbo, WA) in December 2004. Edgewise has been an innovator in Laser Cutting Systems since 1990. The acquisition included product designs, patents and other intellectual property, inventory, and tooling and equipment.

Orca will continue to offer the Laser Cutting System products that were in production at Edgewise at the time of the acquisition. Flat

Bed, Conveyor-Feed, and Shuttle Feed Laser Cutting System machine configurations meet a wide range of customer requirements for size, speed, and material handling.

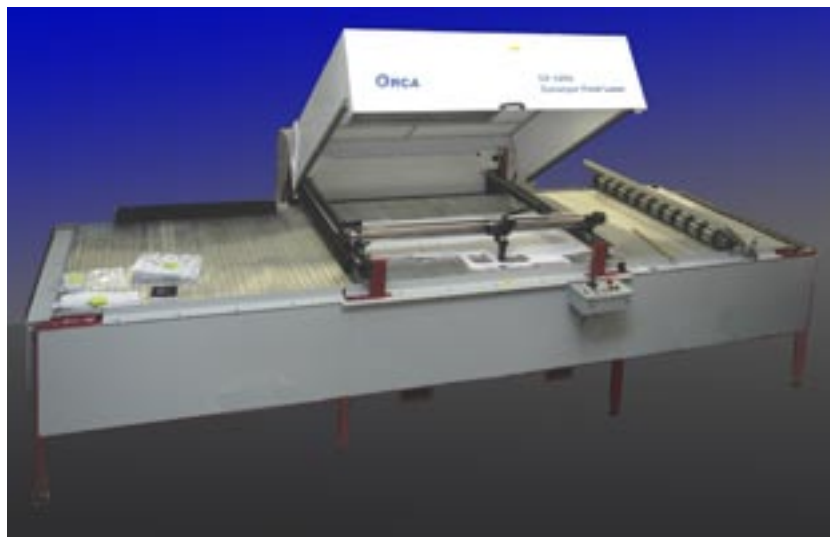
Patrick Momany, founder of Edgewise Tools, continues to work with Orca on a consulting basis, in order to provide his expertise in Laser Cutting technology.

Orca will continue to provide system support and upgrades for existing Edgewise Tools customers.

Orca Delivers Major Laser Cutting System for the Louisiana Association for the Blind

Orca recently completed delivery of a CF1250-100 Conveyor Feed Laser Cutting System to the Louisiana Association for the Blind (LAB), located in Shreveport, LA.

The new system is capable of cutting material up to 50 inches (1250 mm) wide. It can cut a similar length of material in a single pass. However, it can splice adjacent



This new Laser Cutting System features a large cutting area, automated roll-fed material handling via an integrated conveyor system, and 100 Watt Carbon Dioxide (CO₂) laser cutting capability. It is the second system of its type to be deployed by LAB.

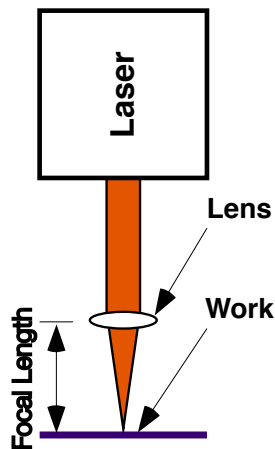
cutting areas (called "panels"), combined with the precision servomotor driven conveyor transport system, to cut parts with much longer lengths.

The new system will be used by LAB to

(continued on page 2, column 3)

What is “Focal Length,” and Why Does It Count?

In every laser cutter, the raw beam produced by the laser is focussed to a small spot at the point where it reaches the work. This focusing is usually accomplished by a lens mounted in the cutting head of the system.



The purpose of lens is to concentrate the laser power into the smallest possible area, in order to produce a very high power *density* at the work, and to minimize the width of the kerf. Without focusing, laser cutting would really not be practical.

In a typical system using a CO₂ laser, the diameter of the unfocused beam might be about 6 mm (0.25 in), while the diameter at the focal point might be 0.2 mm (0.008 in).

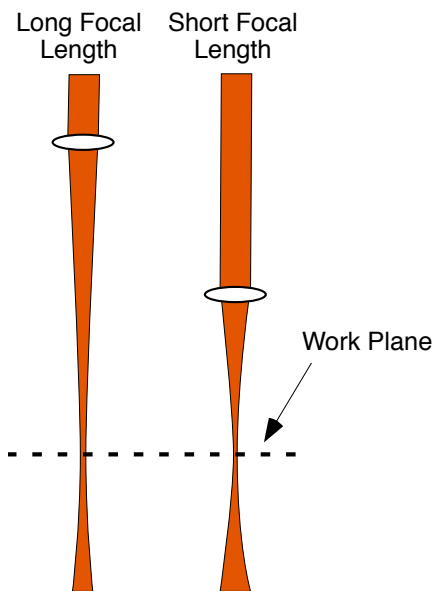
The distance away from the lens at which the lens focuses an incoming parallel beam is called the “focal length.” The system designer must carefully choose a focal length for each system, and this is an important factor in achieving the desired system performance. The most common values used in CO₂ systems are in the range of 2.5–5 inches (62.5–125 mm).

The system must also be designed to ensure that the lens is the correct distance from the work at all times, in

order to keep the focal point located at the plane of the work.

It is natural to imagine that the focused beam comes to a true point, but the reality is more complicated. Because of an optical effect called “diffraction,” the beam is actually shaped more like an hourglass near the focal point. The following figure shows the situation for a long focal lengths (left) and short focal length (right), with both set up to focus at the same work plane.

The shorter focal length has a smaller beam diameter at the work, and therefore cuts faster and with a smaller kerf. However, this more strongly focused beam also enlarges more quickly above and below the work plane. As a result, the vertical zone where cutting works well is reduced, so that the shorter focal length is less



effective for cutting thick material. In addition, the hourglass shape of the beam around the work plane can result in visibly curved work edges when cutting very thick material.

So, as is so often the case in real life,

expand production capabilities in its Traction Systems product line, which includes safety matting and anti-slip tread materials for a variety of marine and aircraft applications.

According to Doug Young, LAB’s Plant Manager, laser cutting offers a wide variety of benefits. “The ability to plot and cut numerous items, of virtually any shape, on a single panel and run it continuously or intermittently, and then to change to different panel designs at the touch of a button, is a tremendous asset. Utilization of the laser cutter dramatically reduces waste and eliminates cost such as blade changes and die replacements associated with a steel-rule die apparatus. The continuous feed system offers flexible design creation, limited only by the vertical cutting area of the machine.”

Established in 1927, Louisiana Association for the Blind (LAB) is a private, not-for-profit 501(c)3 organization providing stable employment, vocational training and rehabilitative services to individuals who are blind and visually impaired in Louisiana. LAB employs a total of 110 people.

there are tradeoffs. No single choice of focal length is right for every situation. A shorter focal length generally provides faster cutting, but does a poorer job with thick materials, is less tolerant of vertical work position, and may cause objectionable curvature of cut edges. Choosing a long focal length ameliorates all of these problems, but at the cost of slower cutting.

Balancing of these factors is always part of optimizing the system for its intended application. Orca’s systems are designed to allow the focal length to be changed in the field, for maximum flexibility.