

the challenge

Because lung cancer is the leading cause of cancer deaths among American men and women, researchers are constantly seeking to develop more effective ways to treat lung cancer. One of the latest innovations in lung cancer radiation therapy is the Dynamic Thorax Phantom developed by Computerized Imaging Reference Systems, Inc. (CIRS). The device is designed to simulate the human body during radiation therapy, including respiratory motion. Such movement during radiation treatment can mean that healthy cells are unnecessarily exposed to radiation. The CIRS Dynamic Thorax Phantom enables medical physicists to locate and treat a simulated tumor while accounting for natural patient respiratory motion. The device ultimately helps to ensure that the correct dose of radiation can be accurately delivered to a patient and reduces the radiation that healthy cells receive.

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CIRS enlisted the aid of engineering firm BBG, Inc. One essential component of the device is the control unit which takes information recorded from the patient’s actual movement and controls the device’s movements to accurately simulate the patient’s movements. This information is then used by doctors to accurately give radiation doses during treatment. As part of the device’s design, the entire control unit needed to be housed in a customized enclosure built to endure an indefinite number of uses in a harsh clinical environment. No off-the-shelf enclosures suited for the device’s specific needs were available, so they solicited the help of Buckeye Shapeform.

“Not only did we need the most cost-effective way to house the device’s sensitive controls, but we needed a one-stop shop that could handle all the enclosure customization,” said Jim Black, president and senior engineer of BBG. “We knew that Buckeye Shapeform had an excellent reputation for their ability to customize enclosures, so we selected them to handle all the customization instead of subbing out the different aspects of customization to separate shops.”

the solution

Based on the control unit’s requirements, the companies decided that the most cost-effective way to fit the needs of the control unit would be to customize Buckeye Shapeform’s existing DII case. Several aspects of the standard DII case needed to change, however, to meet the needs of the control unit.

First, the unit needed to be deeper than the standard DII case—a cinch for Buckeye Shapeform. Second, previous versions of the control unit were anodized prior to punching the necessary holes in the enclosure. Anodizing is a process that strengthens the aluminum and protects it from corrosion. One company would anodize the case, and then another company would punch the holes in the case. Buckeye Shapeform reworked the process by combining all the customization under one roof, first by punching holes in the case, followed by the anodizing process.



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the solution (continued)

“The reversal of the process—completing all modifications first and anodizing last—effectively eliminates potential weakening of the enclosure due to post-anodization modifications,” said Carl Estock, Buckeye Shapeform project manager. “Reversing the process and completing all the customization under one roof seem like such little things, but they go a long way toward delivering a higher-quality, more cost-effective product for the benefit of lung cancer patients receiving treatment with the help of the Dynamic Thorax Phantom.”

the results

The ability of Buckeye Shapeform to perform all the necessary design and fabrication customizations for the CIRS Dynamic Thorax Phantom control unit under one roof resulted in cost and time savings, a higher-quality product, and ultimately, another innovative treatment option for lung cancer patients.

“Every patient deserves the most innovative treatment, and Buckeye Shapeform provided us with an economical and effective way to house the components of one of the latest treatment options,” Black said. “Their team has an amazing ability to envision the big picture and to create effective solutions to difficult challenges.”

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In addition to the control unit enclosure, Buckeye Shapeform was also involved in the design and production of the Dynamic Platform, another component supporting the Dynamic Thorax Phantom simulator. The Dynamic Platform, made of stiff, low-density plastic, provides a sturdy base on which the Dynamic Thorax Phantom is mounted.

“Buckeye Shapeform has handled every job we have given them with expertise and professionalism,” Black said. “Their enclosures help make our products successful, which in turn have a crucial impact in the lives of lung cancer patients.”



To learn more about how Buckeye Shapeform products will work for you, visit our Web site at buckeyeshapeform.com, or call (614) 445-8433 or 1-877-728-0776 (toll free).



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