Application:
Loading a Milling Machine
In this work cell, operators load motor adapter castings ranging from 35 to 70 lbs. into a twin spindle milling machine. The adapters are lifted out of a bin and transferred to the milling machine, where they are lined up and then carefully placed on the soft-jaw chuck. The adapters must be placed with care to prevent damage to the chuck. The milled piece is then moved to a table for deburring and loaded into the second spindle of the milling machine.

Ergonomic Assessment:
Manual Lifting Is Too Big a Risk
An ergonomics assessment of the work cell identified potential hazards and problem areas to address to ensure workers' safety. Based on the assessment, the pump manufacturer began exploring ways to improve the overall safety and productivity of the area. Prior to the G-Force™, operators frequently lifted the parts by hand or with an air balancer. These work practices created potentially harmful situations:

Risk of Injury
The manufacturer was concerned that the position operators had to maintain while trying to carefully place the castings on the chuck put them at a higher than acceptable risk for injury. It was suspected that repeated maneuvers were attributed to injuries reported at this cell.

Product Damage
The costly soft-jaw chucks in the milling machines were repeatedly damaged when castings were put down with too much force.

Lost Productivity
Air balancers took so long to bleed pressure before placing the load that valuable cycle time was lost.

"The G-Force™ is so much smoother than an air balancer - and I don't have to wait for the balancer to catch up!"

The Teachable Lifting Device
Among the G-Force™ versatile features are its teachable virtual limits and speed reduction points, which have proved extremely valuable in this application.

The G-Force™ BXi unit can be easily taught to stop or reduce speed when it reaches specific points in the lifting range. Through use of a sensor mounted on this custom crane system (see Diagram 1), two zones were created, one over the pick point and one over the milling machine.
When the operator is in the pick point zone (Zone 1), he is free to move at his natural pace as he lifts the casting out of the bin (see Diagram 1). As he nears the milling machine, the sensor senses that he is in Zone 2, activating pre-programmed virtual limits and speed reduction points.

These virtual limits and speed reduction points cause the G-Force™ to automatically shift to a slower speed to prevent the operator from slamming the part onto the chuck or into the sides of the machine. As he moves away from the milling machine, the operator returns to moving at his natural pace.

Diagram 1

<table>
<thead>
<tr>
<th>Zone 2</th>
<th>Milling Machine</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Place Point</td>
</tr>
<tr>
<td></td>
<td>Zone 1</td>
</tr>
<tr>
<td>Pick Point</td>
<td>Virtual limits &amp; speed reduction points are activated.</td>
</tr>
<tr>
<td>Zone 2</td>
<td>Operator can move at natural pace.</td>
</tr>
</tbody>
</table>

Protecting People and Parts

G-Force™ has been an ideal solution in many ways:

Reduced Damage to the Machine
Damage to the soft-jaw chucks decreased, eliminating the need for frequent, costly recutting.

Easier Machine Maintenance
When the 300-lb. chucks do need replacing, the G-Force™ can change them out in a matter of minutes, much quicker and easier than using a cherry picker to do the job!

Improved Job Satisfaction
Perhaps most importantly, the operators are thrilled with the G-Force™.

As operator David Rothfuss said, "I couldn't be happier with it. There's just no comparison. The G-Force™ is so much smoother than an air balancer - and I don't have to wait for the balancer to catch up!"

G-Force™ Doubled Productivity!
As a result of the new production machine plus the G-Force™, the manufacturer has increased their productivity 100%, enabling them to decrease their on-floor inventory by 50%:

No more waiting for an air balancer
They are no longer losing valuable cycle time waiting for an air balancer to bleed pressure.

Operators can work at their natural pace
The operators can move at their natural pace without worrying about possibly damaging the adapter or the milling machine. They can count on G-Force’s™ virtual limits and speed reduction points to protect their products.