Air Counterbalances: A Matter of Cost

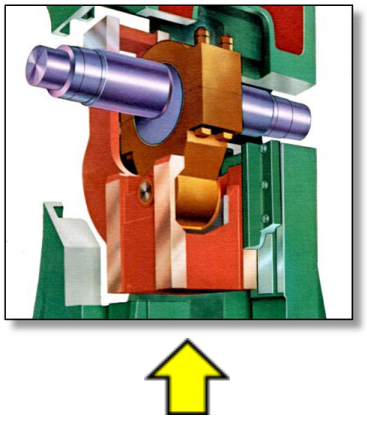
By Peter Campbell & Chris Webster

Ignoring Air Counterbalance Pressure Could Greatly Increase Your Press Repair and Maintenance Cost and Add to Downtime.

As I discussed in my last article, *Air Counterbalances: A Matter of Pressure*, incorrect air pressure setting can greatly damage your press. Counterbalances hold the ram/ wrist pin/ pitman/ main bearing components up tight to prevent the "shock load" of the clearances taken up upon impact. The shock load happens a second time when the press returns to top dead center. "Under counterbalancing" allows for this shock load to occur. Accelerated wear on the bushings, the mating component parts, and the motor occurs when the ram is moving a heavier load. On the other hand, "over counterbalancing" is just as bad for your press. It consumes a great deal of flywheel energy as it works against the air counterbalances reducing tonnage available at the part as well as the risk of having the press get "stuck on bottom." Both situations cause undue wear on your gearing along with the clutch and brake systems. Setting the proper pressure ensures the best working conditions for the press. Ignore counterbalance settings and you will lose time and money in repairs and downtime.

Setting the Proper Pressure

There are several ways to set the proper air counterbalance pressure. The first one involves **floating the ram**. Mount a dial indicator perpendicular to the bottom face of the ram. With the top die mounted to the ram, and the press at bottom dead center, drain the air out of the system. Record indicator travel. Then slowly open the airline and fill the counterbalance just to the point where the indicator stops moving. At this point, the clearances have been removed. Adding more air pressure would put you in an "over counterbalancing situation," draining it down from here would make it "under counterbalanced." Record the PSI setting for each specific die and use that pressure as the setting when you run that die.



Using an Amp Meter

A second method that is popular is to use an **amp meter** on the load side of your main motor starter. With this method you will connect the amp meter to one leg of the main motor. Start the motor to full speed. Put the press in continuous mode. The amperage will fluctuate as you adjust the counterbalance pressure. The goal is to minimize the fluctuation. Too much pressure will cause the amp meter to go "up" on the down stroke. Not enough pressure, and the amp meter will go "up" on the up stroke.

Using the Power Monitor Graphing System

A third method is to use a **Power Monitor Graphing System** with KW RMS (Kilo Watt Root Mean Square) capability. This can be hooked to the 3-phase lines with clamp on CT's (current transformers) and voltage probes to the load side of your main motor starter. KW is a more accurate method, and a 3-phase monitor is even better. Much like the AMP Meter, when this system is hooked up, run the press in continuous mode and monitor the KW to fine tune the air pressure to a point where the motor is running most consistently. Output will be a graph and digital number. A stable graph and number will show the best air counterbalance pressure setting.

Using a PLC Control System

A fourth method is to use a **PLC control system** with a CT (Current Transformer) to PLC input to continuously monitor the motor. If an imbalance occurs at any time a warning can be triggered to alert the operator or maintenance. This is a permanent solution and can dynamically monitor the counterbalance continuously with warnings and alarms for press health. Another method within a PLC system is adding a VFD (Variable Frequency Drive). This will provide power monitoring and dynamic load checking of the drive compared to the resolver position of the ram. With this system, you are monitoring the load every degree of ram position and allows comparison throughout the 360° rotation.

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NEXT GEN FIA FORGING INDUSTRY ASSOCIATION

The FIA Next Gen Committee is comprised of individuals (approximate age 20-35) who are young business and manufacturing employees working in the forging industry. The Next Gen Committee will provide an opportunity to collaborate with peers, share experiences, and discuss the challenges facing the forging industry.

Our mission is to increase awareness and attractiveness of the industry, as well as help to create the next wave of leadership. Members have the opportunity to enjoy plant tours, receive continuing education and training hours through the e-learning Forging University Platform, network, and attend meetings and events to stay up to date with ideas and issues from all over the industry.

Getting involved is a great way to meet young professionals in the field, explore career opportunities, find mentors, and get the skills and knowledge you need for advancement. This is also a great way to advance professional relationships and stay informed as a younger employee.

Interested in learning more about the FIA Next Gen Committee?
Please contact Amanda Dureiko at amanda@forging.org or call 216-781-6260.
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