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Presses, Press Feeders, Conveyors, Coil Handling

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## **B&K** PRECISION LEVELING TECHNOLOGY

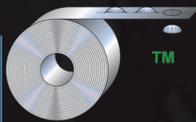


***B&K backed-up roller levelers are designed for precision coil strip flatness and shape correction.***



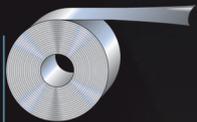
### EDGE WAVE

*Can be either eliminated or induced through back-up roll adjustment.*



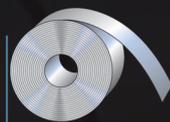
### CENTER BUCKLES

*Stubborn center buckles can be removed through back-up roll adjustment.*



### CROSS BOW

*Any inherent widthwise coil curvature can be removed with simple bank adjustment of leveler head.*



### COIL SET

*Any inherent lengthwise coil curvature can be removed with simple bank adjustment of leveler head.*

[www.bklevelers.com](http://www.bklevelers.com)

## Metalform 2007 Show Issue

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# PROVIDING THE COIL PROCESSING AND METAL STAMPING INDUSTRY WITH THE *LATEST* TECHNOLOGY IN CORRECTIVE LEVELING

by: Matt Watson, B&K National Sales & Marketing Mgr.  
“Visit B&K Levelers at Booth #1037, Metalform Show 2007”



## B&K History

B&K, founded in 1956, specializes in corrective levelers and roll forming systems. In 2000, when B&K was purchased by the Formtek Metal Forming Group, roll forming operations were transferred to Formtek Cleveland and the corrective levelers and high speed uncoilers operations were transferred to Formtek Maine. There are literally hundreds of B&K levelers in use today, located in over 30 countries.

## R&D Enhances Technology and Capability

Upon receiving the rights to the B&K leveler, Formtek Maine embarked on an aggressive research and development program to analyze what changes were required to equip the B&K leveler with cutting edge, state-of-the-art technology. Mechanically it was decided to develop the 5-hi and 6-hi leveler configurations with floating intermediate rolls. This concept traps the intermediate rolls between bronze wearite plates and does not utilize journals on the ends of the rolls. This design allows the end user the ability to grind the work rolls to clean them (this is a common occurrence with a leveler, usually performed annually). When the work rolls are ground the circumference of the roll is decreased which poses a problem for machines that trap the intermediate rolls in journals because a space difference is created between the rolls. The B&K design allows the intermediate rolls to drop right into position upon the newly ground work rolls and, once the upper back-ups are adjusted, there is no space difference to deal with between the intermediate rolls and the work rolls.

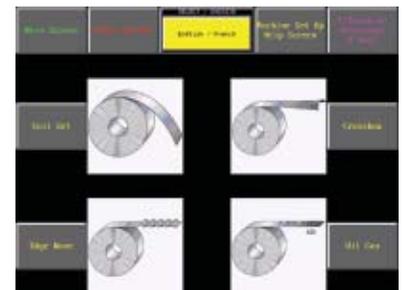
## Quick, Easy Roll Cleaning

Access to clean the work rolls is always a concern in corrective levelers due to the number of rolls within the machine. Levelers quite often process critical finish materials and any foreign matter on the work rolls quickly transfers to the end product resulting in excess scrap material being produced. B&K, understanding that down time to clean the rolls and scrap material is very costly to the customer, in-

corporated a powered high-rise head design into every leveler. This feature allows the head of the leveler to open with a push of a button and provide 6” of clearance for quick and easy access to clean the rolls.

## Multi-Function, Intuitive Control Platform

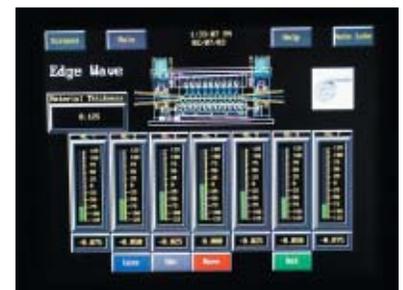
A completely new control platform was designed to allow all of the settings in the leveler to be accomplished through the HMI (touch screen) interface. The HMI (Human Machine Interface) provides other operator benefits as well. Complete maintenance and operator thread-up training manuals are provided. A comprehensive diagnostics package has also been developed. A help screen has been integrated to allow the operator a reference setting based on incoming material surface conditions (as seen below).



*Sample help screen*

## Identifying Corrective Leveler Applications

Understanding the difference between a corrective leveler and a straightener is key when specifying what type of equipment is required for a certain job. A straightener will only correct for coil set and some cross bow as it has no adjustable back up rolls. These coils have typically already been leveled and only have the memory from being wound up (coil set) within them. This condition can be corrected by utilizing a straightener and adjusting the head tilt based on



*Preset back up roll adjustments based on edge wave condition*

material thickness from entry to exit to flatten the strip. Coils that have other conditions such as edge wave or center buckle require the use of a corrective leveler to obtain flat material from these incoming coil conditions.

A corrective leveler has power adjusted back up rolls to allow the operator to work the material in specified regions as required to flatten the strip. A coil that has edge wave requires the center of the strip to be worked and stretched to have the same length material as the outside edges. In center buckle applications just the opposite is required. The center of the material is longer than the edges. This differential requires that the edges of the material be worked to become the same length as the center thus resulting in flat material being obtained on the exit of the corrective leveler.

Levelers have been traditionally thought of as only being utilized in cut to length or blanking applications in the past. This is due to service centers obtaining coils directly from the steel mills and these coils quite often have edge wave and center buckle present within the coils which needs to be removed prior to producing blanks. However in today's press feed market segment more and more people are looking to process HSLA (high strength low alloy) material as a requirement of the automotive markets. This material is thinner and much stronger and is a benefit to the automotive arena as the parts are lighter than the same parts manufactured out of mild steel. The draw back when processing HSLA material is that the yield strength is very high and usually requires more work to be performed to it than a conventional straightener can provide. A leveler with 17 or 19 work rolls, with a smaller diameter, and closer center distances allows the material to be worked beyond its yield point and remain in a flat state after being blanked in a press.

Any press feed system equipped with a corrective leveler is able to offer added flexibility to the overall facility offerings. These systems can feed the conventional progressive die applications as well as supply quality blanks cut within the press. The tooling within the press can provide standard rectangular blanks or, with the right tool, custom shaped blanks. These blanks can be used to feed transfer operations in other locations within the facility or allow the option of supplying quality blanks to other facilities.

### **B&K Leveler Retrofit Installation**



*B&K 84" leveler for a tier one manufacturer of automotive components*

The B&K 84" wide 1.75" roll diameter Leveler shown here was integrated into an existing press feed line for a tier one manufacturer of automotive components. The spread-centered flattener/straightener that was originally sold in the press feed line could not meet the part quality requirements. To replace the flattener/straightener and integrate a B&K Precision Leveler into the existing line required a custom hold down peeler-threader and a custom consolidated control package including pushbutton controlled thread up. The Formtek Maine engineering department was able to design a control that would not only run the Precision Corrective Leveler but also control the existing equipment in the press feed line.

### **B&K Leveler Cut-to-Length Application**

A leading appliance manufacturer requested Formtek Maine to supply multiple complete cut-to-length systems all with B&K corrective levelers to supply specialty blanks to feed their cabinet line to produce their end product of upright refrigerator/freezers.

One system designed to produce the wrapper or complete outer shell of the refrigerator had several custom features which needed to be incorporated into the leveler. The pre-painted, critical finish material to be processed also needed to be trimmed to a precise width. The other systems were designed to supply the door and back bottom blanks for the refrigerators. All of the complete systems also required special Allen Bradley® control platforms to meet the requirements of the customer.



*B&K 60" leveler for leading appliance manufacturer*

Formtek Maine supplied CWP CTL systems with B&K corrective levelers to meet the customer requirements. The models provided were BK60/1.156/19/5/3-5HI machines. These units were 60" wide with roll diameters of 1.156", 19 work rolls, 5 backup flights, 3 adjustable backup flights and featured a 5 HI design for single side critical finish applications. The small roll diameter with adjustable backups allows for material from .008" - .045" to be leveled to supply quality flat strip for down stream operations. The B&K leveler within the wrapper line also had to drive an edge trimmer and chopper unit as the blanks for the outside of the refrigerators could not have any deviation in the width of the blank. The edge trimmer was mechanically geared to

the leveler drive train to ensure the edge trimmer ran at the same speed as the leveler output so no slack material was accumulated between the leveler and the trimmer unit (as shown).

### **B&K Leveler New Press Feed Application**

In January 2006, a tier one automotive supplier requested Formtek Maine to supply a duplicate CWP press feed system with a B&K corrective leveler to in addition to the one they installed in June 2003 within their facility. The system had the same requirements as the previous system and needed to process material from .021"-.120" thick with yield strength of 135,000psi. A B&K36/2.25/17/3/1-4HI machine was provided for the application.



*B&K 36" leveler with custom consolidated control package*

The leveler (as seen above) was 36" wide, roll diameters of 2.250", 17 work rolls, 3 backup flights, 1 adjustable backup flight and was a 4 HI design for non surface critical finish applications. It had a 40 HP AC vector drive with encoder feed back to regulate line speed at 150FPM and reduce coil clock springing within the looping area. A custom consolidated control package including pushbutton controlled thread up was included. A multi-color diagnostic HMI (touch screen) interface provided operator prompting of threading procedures, a maintenance schedule with service points for the entire system, on-screen digital roll position readouts and in-depth diagnostic fault messages with recommended remedies.

### **The B&K 85,000 Square-Foot Facility in Clinton, Maine**

B&K is an industry leader in corrective levelers with over 50 years of experience and innovation. Our ability to maintain 98% of our product production within our facility allows us full control over our shop throughput. Our 85,000 sq. ft. facility is designed for efficient product flow — from raw material at the fabrication end of the building to finished product shipping to our customers from the assembly end of the building. In the center of our building, product moves through a state of the art machine shop which utilizes multiple horizontal turning centers, two of them with automatic bars feed capability and one with dual turret and turning capacity of 19" diameter, 157" between centers and

6600lbs. loading capacity, as well as multiple CNC machining centers and a CNC Bridge Mill with travel capacity of 69"X x 126"Y x53"Z are also critical to our operation. The facility is also equipped with roll hardening and grinding capabilities. Programming for the machine shop is accomplished with Surf cam software. The Formtek Maine manufacturing department is staffed with 71 highly trained employees. We have an engineering staff of seven people which allows us to quickly process customer orders as well as provide custom coil processing application solutions. Our sales staff consists of 10 people available to rapidly respond to customer applications and provide the quickest quote turnaround time in the industry. The service department is staffed with seven people — four located in Clinton, ME, one person in Chicago, IL, one in Piqua, OH and one in Dallas, TX. This allows us to provide quick response to our customers no matter where they are located. We also utilize a true 24/7 service program which allows our customers direct contact with a factory technician anytime it may be required.



*B&K 85,000 Square-Foot Manufacturing Facility in Clinton, Maine*

So if you require a parts leveler, a cut-to-length system with corrective leveling, or have an existing cut to length or press feed system and need to upgrade to a corrective leveler, B&K has a cost effective solution to meet your needs with the best delivery in the market!

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For more information about B&K corrective levelers please contact:



*a division of Formtek Maine*

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