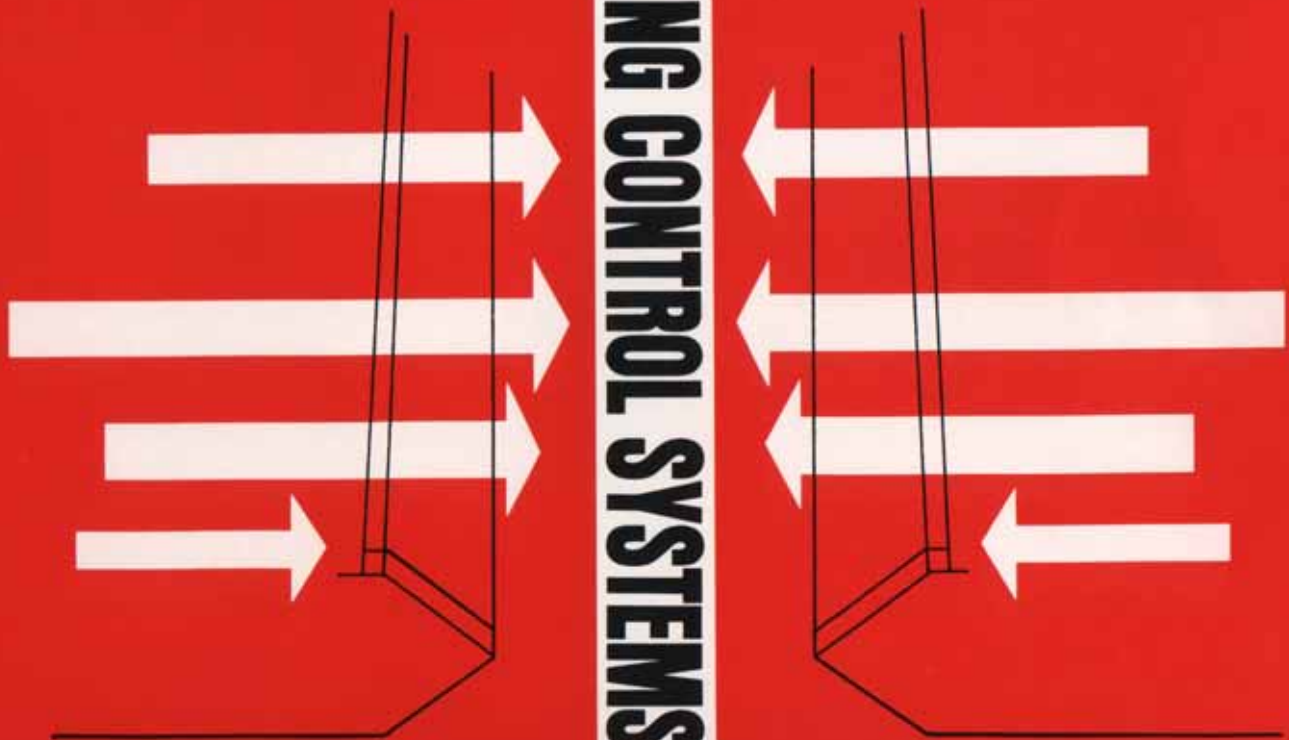


AWA

AIR WIPE AND COATING CONTROL SYSTEMS

CCS[®]



AWACCS, a method of controlling the thickness of hot dip coatings on strip metals has been developed and perfected by Coating Control, Inc. Concentrated jets of air (or other gas), discharged through slots in air knives directed at the moving strip, penetrate the molten coating and turns some of the spelter back into the coating pot.

Line speed, knife position and pressure in the knife influence the depth of the jet's penetration which determines the coating thickness left on the strip. Knife pressure, which can be controlled by adjusting a valve or varying the blower speed, affects the coating weight because the jet's kinetic energy (mass x velocity) is increased as pressure increases. The knife to strip distance affects coating weight because the velocity of the jet is a function of distance.

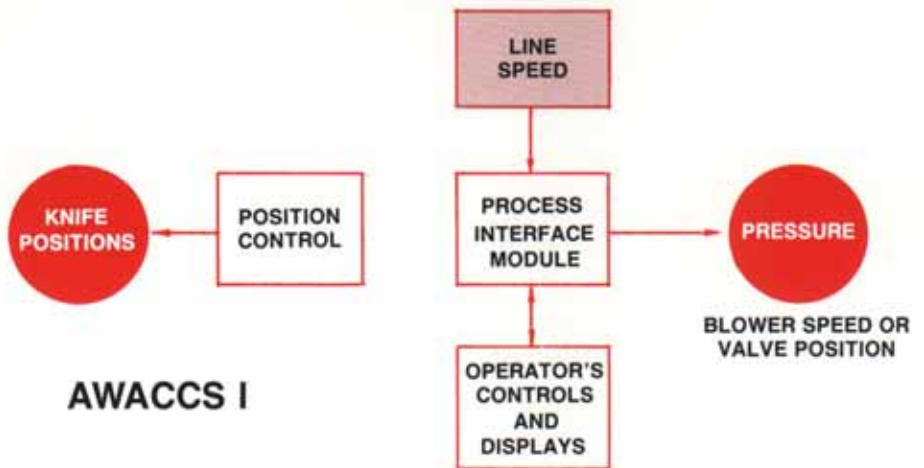
Presently installed AWACCS systems confirm improved yields, energy savings and lower maintenance costs. Typically, a system can show a payback in less than one year.

Coating Control, Inc.

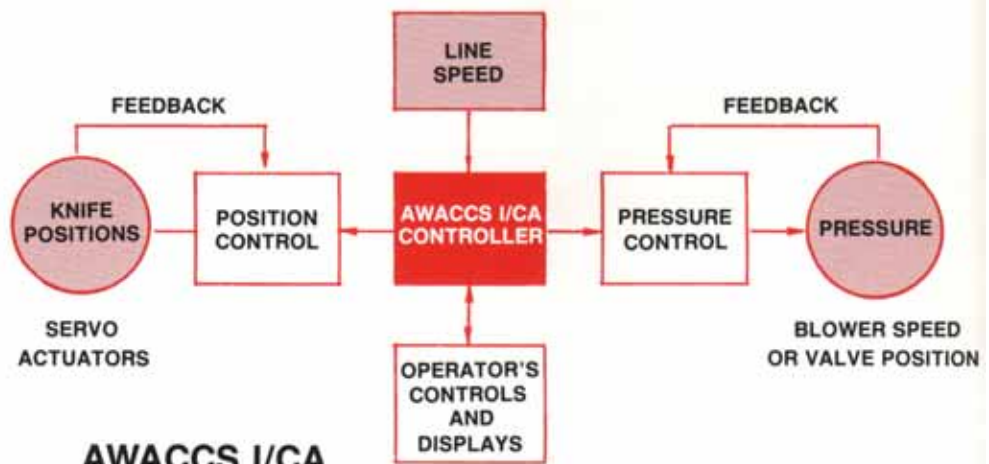
AWACCS I provides a highly effective control of strip coating weight. Hi-technology air knives and positioners give the Operator two variables to use in controlling the coating profile; pressure and position control. The system features a feed-forward control, having line speed as the command and static pressure as the controlled process. By monitoring process line speed, the system is able to automatically change knife pressure, so as to maintain constant coating thickness over the entire production speed range for a given product.

Three options of controlling knife position are available. They are (1) manually positioned with mechanical hand cranks, (2) electrically set by pushbutton control, or (3) by thumb-wheel switches and electro-servo motors.

AWACCS I/CA is a controller assisted system. A microprocessor based controller provides enhanced control. The system operation is similar to that of the AWACCS I except that custom software is developed based on empirical data. System flexibility allows for additional control functions and peripheral devices. The Operator interfaced controller may adjust pressure only with manual position corrections, or it may also control the position.

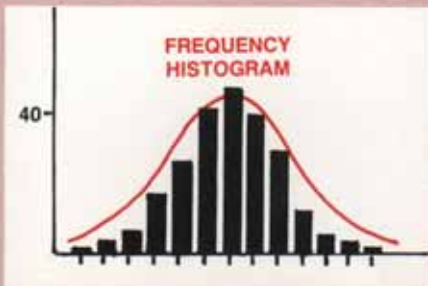


AWACCS I

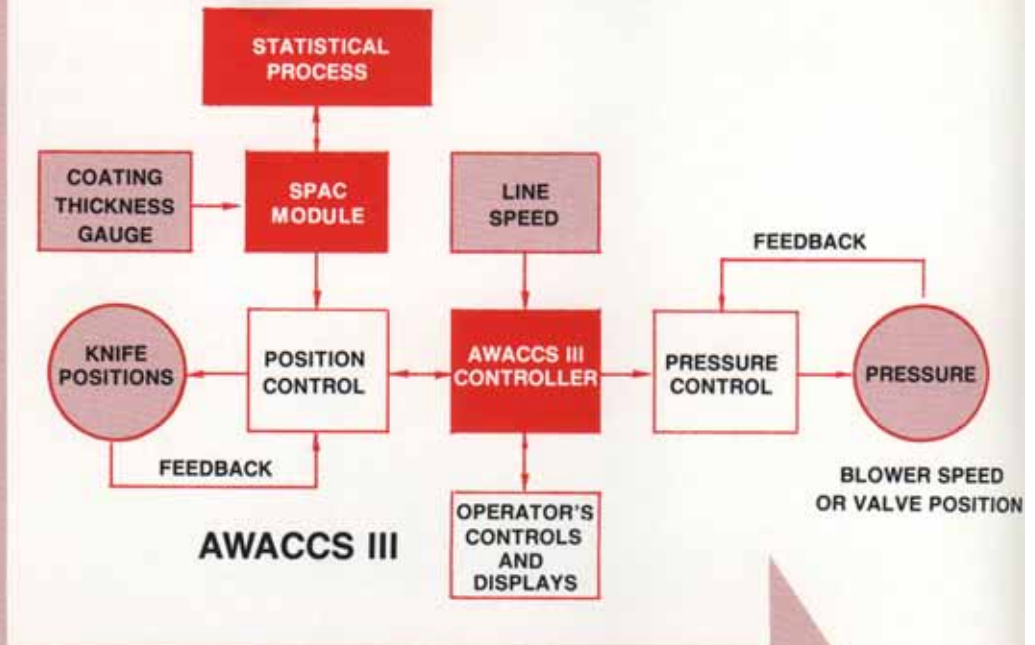


AWACCS I/CA

AWACCS II is similar to the AWACCS I/CA except a feedback loop is added from an on-line coating thickness gauge. The system's accuracy is maximized because the loop is only needed to compensate for relatively small errors having low change trend rates. AWACCS II allows the system to remain in the closed loop mode even during changes in product, coating target weight, line speed, or if the position set point is changed for a new coating.

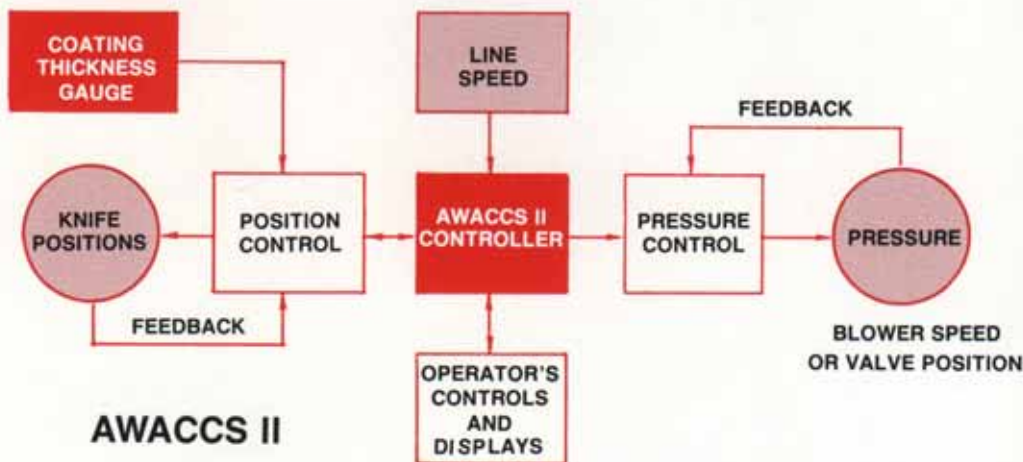


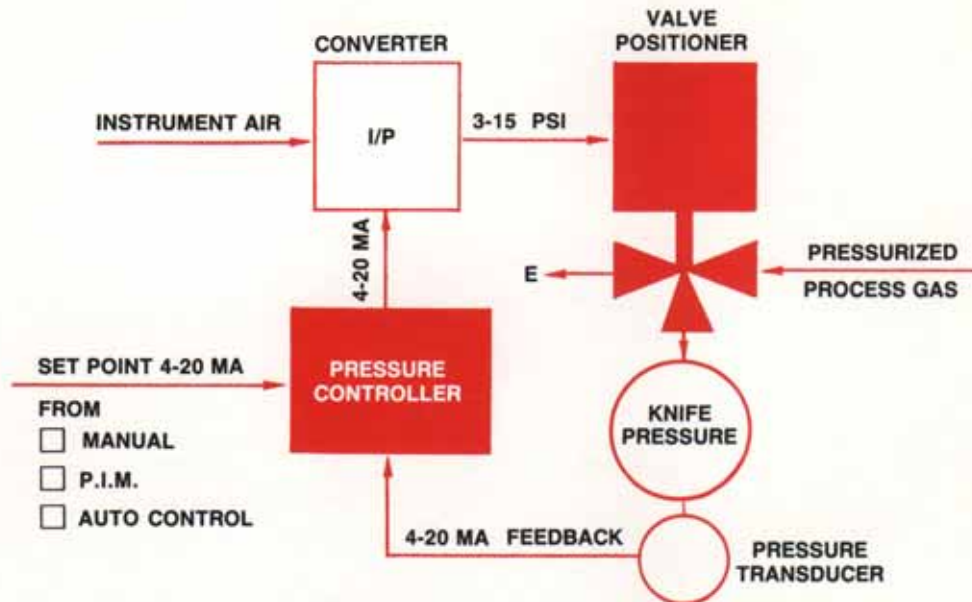
Typical charts which provide information for instant analysis and control.



AWACCS III. New industry specifications for coated strip stress precise control of the distribution as well as the average coating weight. By incorporating real-time statistical process control techniques, quality can be optimized. Statistical control chart techniques enable coating lines to practice defect prevention rather than defect detection.

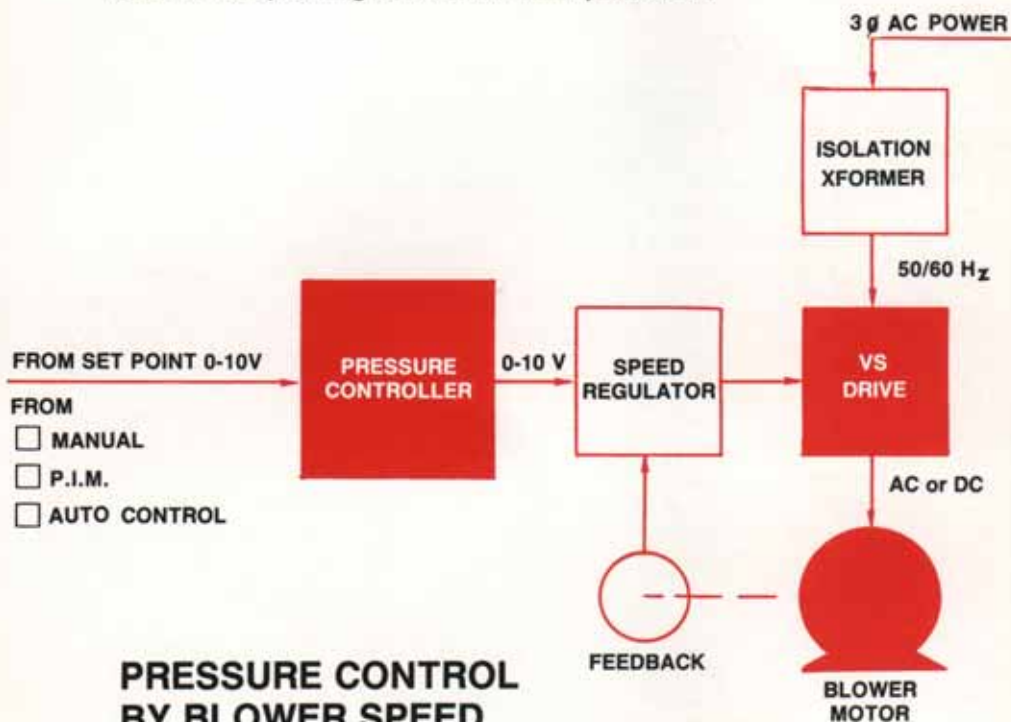
The system includes standard high level software customized to communicate with a new or existing MIS system. AWACCS III also maintains a history data base for report generation and statistical analysis.





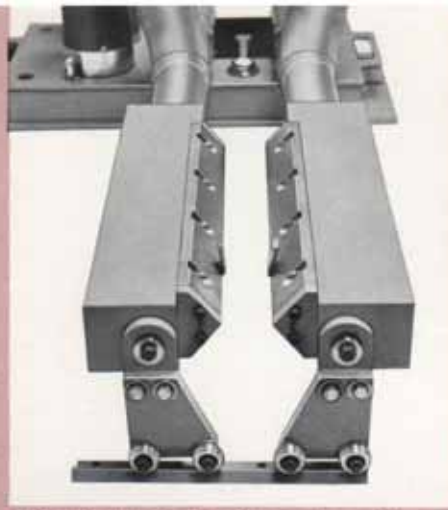
PRESSURE CONTROL BY VALVE POSITION

By regulating a bleed off valve, knife air pressure can be controlled. Closing the valve to the knife gas supply modifies the system curve, thereby reducing the flow. The equipment costs are economical because a constant speed blower can be used, but operating costs are higher since motor speed is constant even while operating at lower air knife pressures.



PRESSURE CONTROL BY BLOWER SPEED

A variable speed blower may be used to replace the less efficient valve position control. Since volume varies linearly with speed, but power consumption varies as the cube of the speed, input power is significantly reduced for lower pressures. The variable speed blower also provides a more accurate and repeatable means for regulating air knife pressure.



Hi-technology air knives and positioners for precise coating control on a small line.



A typical Operator's Control Cabinet, designed for use with computer assisted or computer controlled systems.



A large line coating rig including the air knives and elevator positioners to provide a three mode control.

OTHER R & D PROVEN SYSTEMS:

- MINI SPANGLE
- PASSLINE CONTROL
- NITROGEN JET FINISH

Coating Control, Inc. was established in 1978 as a consulting engineering firm, concentrating specifically on problems relating to continuous coating in the galvanizing industry. We have been successful in developing a number of unique and innovative coating control systems which have been incorporated in many installations throughout the world in galvanizing, tinning and other hot dip coatings.

The in-depth experience gained has led us to the development of new products and new applications in both continuous hot dip and electro-coating areas. Contributors to our progress are a number of major steel companies which have licensed us to use their patents and draw on their experience for many of the coating and strip control systems we have designed.

Our staff of professional engineers, designers, and drafting personnel is capable of providing expertise in all phases of civil, mechanical, and electrical engineering. Some projects require custom engineering due to special site considerations or specific requirements, and we have the capability of providing a tailored design service to meet these needs.

Whether you're building a new, or updating an existing facility, we can be of service. Call or log on to <http://www.coatingcontrol.com> so we can respond promptly.

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