

## **Analog (as in analog signal)**

A signal that varies in amplitude or voltage over a given range.

## **Analog Follower Control**

A control that accepts a voltage or current of varying amplitude and produces an identical, but stronger, signal at the output, suitable for driving a brake.

## **Butt Splice**

A splice in which two webs are placed end to end without overlapping, and adhered together by a piece of adhesive placed over both. Most common with paperboard.

## **Controlled Stop**

Stopping of the roll and web while maintaining tension at the prescribed level.

## **Core**

The hollow center (usually made of heavy paperboard) on which the roll of material is wound.

## **Core Diameter**

The smallest diameter of an unwind roll.

## **Cutter/Creaser**

A machine used in the production of folding cartons. It uses sharp knives to cut through the board and dull knives to crease the board along a fold line.

## **Dancer**

A movable, often pivoted, roll placed in a loop of the web, which is weighted or loaded to add tautness or tension to the web. Often used as part of a feedback loop to control brake operation.

## **Die Cutter**

A machine which cuts or stamps paper or board to a specified size or shape with a steel die. The die is part of an impression cylinder in a rotary die cutter.

## **Duplex**

Paper or paperboard that has a different color, texture or finish on either side. Also sometimes applied to any multi-ply paperboard.

## **Electro-Pneumatic Modulator**

A device that modulates, or controls, an air brake in response to a set of control parameters.

## **Emergency Stop (E-Stop)**

General term to describe immediate stop of a converting or printing machine due to a malfunction or unsafe condition. Normally done in fastest time possible.

## **Equipment Sizing or Sized**

A method of tensioning a web at the in-feed that is sometimes used in printing operations. An equipment sized in-feed roller is slightly smaller than the printing impression cylinder. This creates a back tension in the web since each rotation of the printing impression cylinder pulls more web than is being fed by each rotation of the in-feed roller. Not as common as a variable sized in-feed since it requires changing the in-feed roller along with the impression cylinder.

## **Festoon**

A reserve area consisting of several loops of stored web. This reserve is drawn down to feed the converting process while roll feed is interrupted for splicing.

## **Force Transducer**

A device that senses the magnitude of a load upon it (such as a tension load) and sends a corresponding signal out. Also called a load cell.

## **Grabiness**

“Stick-slip,” or lack of smoothness during slip operation of a braking system.

## **Heat Dissipation (in a brake)**

The ability of a brake to release heat generated by friction. Dissipation usually increases with RPM. Dissipation can also be increased by forced cooling, e.g., by a fan.

## **Inertia Stop**

An emergency stop where the prime objective is to get the unwind roll and machine to a rapid stop, disregarding any control of the web condition. The inertia of the roll is the largest factor in determining speed of stop, for a given machine braking system.

## **Lap Splice**

A splice in which the ends of two webs are overlapped and adhered together by a piece of adhesive placed on the contact side of one.

## **Load Cell**

See Force Transducer.

## **Nip Rolls**

A pair of driven, rotating rollers which act to pull the web into or through the converting process.

## **Pivot Point**

The central point of rotation, as in a dancer arm.

## **Pivot Point Sensor**

A sensor mounted at the pivot point of the dancer arm, which determines which direction the dancer is moving, and where it is in its arc of travel.

## **Register**

The exact, corresponding placement of successively printed images on the web of material.

## **Sheeter**

A machine that cuts a web of material into individual sheets.

## **Slip**

The relative motion, or sliding, between the two members of a braking system. In tensioning, the smoothness of slip is critical to maintaining tension.

## **Slitter-Rewinder**

A machine that unwinds the wide rolls of material, slits them to narrow widths, and rewinds them into narrow rolls.

## **Splice**

The joining of the ends of two webs to make one continuous web.

## Splicer

A machine with two (or more) unwind rolls of material. As one roll expires, the other is “spliced” to the end of the first, to provide a continuous web of material to the process. Splicers are referred to as “zero-speed” if the splice occurs when the new roll is stopped, with paper feeding from a festoon storage system. A “flying splicer” is one where the new roll is accelerated to line speed before splicing the roll, and roll feed is continuous.

## Taper Tension

Constantly decreasing tension on winders to help eliminate telescoping and core crushing.

## Tensile Strength

The force, parallel to the plane of the specimen, required to break a given length and width of material.

## Tension

The tautness in a web of paper or material. The press or process produces a “pull-through” effect, which is countered by the unwind brake. Each material has an optimum tautness, or tension, and it is the job of the tension system to maintain this tension.

## Torque

The braking force which holds the unwind roll from unwinding. Usually referred to in pound-feet or pound-inches of torque produced by the brake.

## Transducer

A device that changes one type of signal into another. In tensioning, the most common types are electric-to-pneumatic transducers, and force transducers. See Force Transducer.

## Web

A continuous strand of material coming from the roll in its full width. It remains in web form until “terminated” by a sheeter, die-cutter or other device.

## Web Break Detectors

Sensing devices that monitor the web and signal a shutdown or E-stop if a web break occurs. This is a good photoelectric application.

## Web Draw

Tension or tautness induced in the web by the pulling action of the printing press or process, resulting in web movement in that direction.

## Wrap Angle

Refers to the wrap of the web around a roller, especially a dancer roller. Expressed as “degrees of contact” with the roller.

## Conversion Factors

Millimeters x 0.03937 = inches

Inches x 25.4 = millimeters

Centimeters x 0.3937 = inches

Inches x 2.54 = centimeters

Meters/minute x 3.280 = feet/minute

Feet/minute x 0.3048 = meters/minute

Kilograms x 2.205 = pounds

Pounds x 0.4536 = kilograms

Newtons x 0.22482 = pounds

Pounds x 4.448 = Newtons

Watts x 0.001341 = horsepower

Horsepower x 746 = watts

Kilogram-meter<sup>2</sup> x 23.753 = pound-feet<sup>2</sup>

Pound-feet<sup>2</sup> x 0.0421 = kilogram-meter<sup>2</sup>

Newton-meter x 0.722 = pound-feet

Pound-feet x 1.385 = Newton-meter

Grams/meter<sup>2</sup> x 0.613495 = pounds (basis weight)

Pounds (basis weight) x 1.630 = grams/meter<sup>2</sup>

$$\text{Lineal feet} = \frac{36,000 \times \text{roll weight}}{\text{roll width} \times \text{basis weight}}$$

$$\text{Approximate roll unwind time} = \frac{\text{lineal feet}}{\text{linear speed}}$$

Effective cylinder force at a given air pressure

$$F_{\text{CYL (lbs.)}} = P_{\text{PSI}} \times \frac{(\text{cylinder piston diameter}) \text{ in } (\text{in})^2 \times \pi}{4}$$

**Example:** PSI = 30

CYL dia. = 2 in.

$$F = 30 \times \left( \frac{2^2 \times \pi}{4} \right) = 94.2 \text{ lbs.}$$