

Recycled Paperboard Technical Association

Welcome

Paul Schutes RPTA Executive Director

Housekeeping

If kicked off, reconnect in a minute.



- Webinar is being recorded for later posting on RPTA members-only website
- Attendees cannot be seen or heard



 Presentation slides will be emailed to attendees who respond to RPTA's webinar feedback form.

Kate McGlynn RPTA Associate Executive Director



Introduction

Mark Murphy Operating Board Member General Manager, WestRock Lynchburg



Safety Opportunities for Older Winders



Recycled Paperboard Technical Association

Scott Springmier, Product Manager, Winders

Jack Corbett, Manager, Product Safety

Eric Stoever, Senior Product Manager, Specialty Winders



Why the Increased Focus on Safety?



- Higher speeds and more serious injuries.
- Demand from the industry.
- Changes in regulations / laws.
- The high cost of litigation and lawsuits.
- Advances in technology

Why is Winder Safety So Important?



- The winder is one of the most hazardous areas in the mill.
- The winder is a batch process, starting and stopping 5 to 10 times per hour.
- Safety standards have increased whereas many mills operate 20+ year old winders as they were originally designed.
- Winders are beholden to the paper machine; operators take short cuts to keep up.

Winders of Yesteryear





Winders of the 1960's, 70's





Winders of the 1980's





Winders of Today





Standards in Use In Winder Design



- Occupational Safety and Health Administration (OSHA)
- American National Standards Institute (ANSI)
- ISO, EN and CEN Standards (Europe)
- National Electrical Code (NEC)
- Canadian Standards Association (CSA)
- Canadian Electrical Code (CEC)
- American Society of Testing Materials (ASTM)
- American Society of Mechanical Engineers (ASME)
- Among others....

Standards in Use In Winder Design



- Occupational Safety and Health Administration (OSHA)
- American National Standards Institute (ANSI)
- ISO, EN and CEN Standards (Europe)
- National Electrical Code (NEC)
- Canadian Standards Association (CSA)
- Canadian Electrical Code (CEC)
- American Society of Testing Materials (ASTM)
- American Society of Mechanical Engineers (ASME)
- Among others....



How do you balance winder safety with limited capital and productivity?



Where do we start?





Winder Safety Audit



- Determines the gaps between existing winder and current EN/ISO standards
- Identifies solutions
 - Can the hazard be designed out?
 - If not, can a fixed guard be applied?
 - Can circuits be updated to meet desired PLr level?

A capacity audit should also be done to determine impact of the changes!

Winder Safety Hierarchy

Prioritizes the recommended solutions



Automatic Functions

Splicing Guard

Threading Improvements

Fluid Control Improvements

Electrical Control Improvements

Mechanical Holding Devices

Guarding, Fencing, Warning, E-stops

Winder Safety Hierarchy

Prioritizes the recommended solutions



Automatic Functions

Splicing Guard

Threading Improvements

Fluid Control Improvements

Electrical Control Improvements

Mechanical Holding Devices

Guarding, Fencing, Warning, E-stops



Perimeter Access Control



Creation of Safety Zones



- Allows operation in one zone when another zone is infringed
- Improves uptime / capacity





Pictographic Safety Signs

Visually depict the potential hazard



Request to enter zone / reset zone access pushbuttons





Fortress Locking Gate Switch







Area between cradle and front drum requires operator protection and control





Roll Discharge Equipment





Cross-machine E-Stop switch

Area scanner in cradle discharge zone





Winder Safety Hierarchy





Mechanical Holding Devices



- Cradle wait position
- Nip guard up position
- Rider roll full travel
- Core locks full travel
- Ejector at home position

Sliding Pin Hold Stops



 Pneumatic actuated sliding pin type roll hold stops. Sides of cradle are fenced. Discharge is interfaced to light curtain or



Intermediate Cradle Stops

Prevents unexpected roll discharge





Core Chuck Safety Latch





Core chucks and rider roll assemblies have full stroke dragon-back safety latches





Winder Safety Hierarchy





Electrical Control Improvements



- Safety PLC
- Safety I/O monitoring safety devices
- Remove power from existing fluids and electrical circuits
- Normally accompanies safety fencing, gates and zones

Early PLC design

No safety related components <1990





ISO 13849 Safety Rated Control



Includes control system, electrical & fluid actuation and feedback PLd component reliability, and CAT 3 redundancy



Safety Rating of a System



- CAT1 Basic system with no redundant components
- PL_c Utilizing components that you can prove will achieve no combined failure MTTF_d ≥ 30 years (Mean Time Between Dangerous Failure)
- CAT3 with Redundant components and Diagnostic Coverage. (Ability to detect dangerous faults) Need > 60% of faults detected
- PL_d Basically verifying that the components of a CAT3 system (Redundant components and Diagnostic coverage) meet the rating of MTTF_d ≥ 30 years (Mean Time Between Dangerous Failure)

Structure According to CAT 3



(EN 13849-1, chapter 6.2.6)



Dashed lines represent reasonably practicable fault detection.

Key

- interconnecting means
- c cross monitoring
- I1, I2 input device, e.g. sensor
- L1, L2 logic
- m monitoring
- O1, O2 output device, e.g. main contactor

Requirements for the implementation of performance level PLd:

<u>1) Components of the highest reliability level (MTTF_d \ge 30 years) AND diagnostic coverage \ge 60%</u>

2) Components of the average reliability level (10 years \leq MTTF_d \geq 30 years) AND diagnostic coverage \geq 90%

Replace existing console with PC/HMI control desk and remote PanelViews





New operator control panel with safety PLC and new HMI







Windcontrol Windposit Curves Recipe Set	Change Unwind Threading	Run Help	Print
Winder H	elp System		
Select Function DESIRED	ACTION		
FUNCTION	STATUS	PLC ADDR	DEVICE
Rider Roll Down On Empty Cores	Off	B10/2701	
INTERL	.0CKS		
FUNCTION	STATUS	PLC ADDR	DEVICE
Fending Side Core Lock at Down Position	Not Down	1:136/14	26GS10
Drive Side Core Lock at Down Position	Not Down	1:136/12	26GS14
Core Locks Up Solenoid is Off	ОК	0:135/04	26GSV02
Core Locks Close Solenoid is On	Close Not On	0:135/10	26SV04B
Fhreading Quick Stop is Reset	0K	B10/4302	03EC01
Emergency Stop is Reset	OK	N101:12/00	01EK02
Rider Roll Photo-eye Alarm is Reset	0K	N101:14/06	27CS01B
Windup Safety Gates Closed and Reset	0K	N101:15/10	
Web Cutting Device at Home Position	Not At Home	1-1 44/1 3	346911
Web Co The help system is a tool to diagnose wh displaying a color coded status o	y a machine function f all interlocks for the	n does not w at function.	ork by
Hydraulic Oil Pressure is OK	ОК	N101:13/03	05PS11
Rider Roll Proportional Valve Has Not Faulted	ОК	N101:14/09	27GSV03
Safety Lock Open Tend Side (Opens when attempting to lower rider roll)	Not Open	l:140/07	27GS13
Safety Lock Open Drive Side (Opens when attempting to lower rider roll)	Not Open	l:140/05	27GS14

- 1 -

-

Winder Safety Hierarchy





Hydraulic Circuit Safety



- - Latest fluids controls
 - Upgrade hydraulic control circuits to latest ISO 13849 level, PLd
 - Circuit feedback devices

Winder Safety Improvements





Threading Improvements



- Slitters to rear drum threaders
- Splicing air assist jets
- Rear drum web holders
- No cores during threading
- Hold to run interlocking while splicing
- Stop front drum rotating while threading

Threading / Splicing improvements





After slitter threading with powered belt threader after slitters





Winder Safety Hierarchy





Splicing guard automatically positions to varying roll diameters





Winder Safety Hierarchy





Automation of Manual Tasks



- Eliminate the risk by eliminating hands-on tasks.
- A few examples:
 - Set change including automatic sheet cut off, core feeding and core glue application
 - Automatic wound roll tail end glue application (eliminates discharge deck task of roll taping)
 - Auto-positioning slitters
 - Automatic trim ribbon cutters
 - Tail preparation / broke removal drive
- All of these automated upgrades both increase winder throughput and remove the operator from exposure to potential hazards.

Core Feeding and Gluing





Set Change Web Cutting Position





Full roll eject and vacuum placement of cores





Thank You!





Winder Safety



Recycled Paperboard Technical Association

Questions

Mark Murphy

Contact Information

Scott Springmier Product Manager, Winders Valmet 920-585-8031 M Scott.springmier@valmet.com Eric Stoever Sr. Product Mgr. Specialty Winders Valmet 518-330-1986 <u>eric.stoever@valmet.com</u> Jack Corbett Manager, Product Safety Valmet 413-637-3752 Jack.Corbett@valmet.com

Please respond *post-webinar* request for feedback

