

Class Descriptions

42nd LMS Seminar — April 16-18, 2019

A-0 How One Child's Loss Lead to Paradigm Shift in Chairlift Operations

Mark Petrozi, ARM • Alpen Risk Safety Advisors, LLC

When 7-year old "John John" Henderson, a Sugar Bowl race team member died following a fall from a chairlift at Sugar Bowl Resort near Lake Tahoe in 2011, he became the first and only child fatality resulting from a fall from a chairlift in the United States. But his loss was not in vain. His parents, Dr. Mark Henderson and Dr. Helen Chew—worked proactively with Sugar Bowl to help the resort re-think and overhaul the resort's chairlift loading (and other) procedures, ushering in the development of a program containing some of the most thoughtful and comprehensive practices and procedures to improve guest safety on lifts. The family's commitment to improving all aspects of chairlift operations underscored their sincere commitment to improving chairlift safety for everyone and emphasized how Mark, Helen and Sugar Bowl turned this tragedy into a truly progressive chairlift safety program. Petrozzi was retained to work with Mark, Helen and the Sugar Bowl team following this tragedy in the development and refinement of the program and will address the incident, the unique issues with children and lifts, and how Sugar Bowl took numerous steps that became a model for other resorts to consider and adopt.

A-1 AC Electric Motors

Dave Cunningham • Applied Dynamics

One of the most critical parts of your operation is the A.C. motor. This class will explain the different types of A.C. Electric Motors used at your Ski Area. The construction, operation and recommended maintenance for your motors will be discussed. Particular attention will be paid to the requirements for today's use with a VFD.

A-2 Basic Electrical Circuits - Part I

Bruce Wyman • S-K-I Electric

We will begin by understanding the terms used in electrical theory, and understanding the relationship of Voltage, Current, Resistance, and Wattage. We will then move on to the three fundamental electrical circuits, Series, Parallel, and Series/Parallel to begin to understand circuit paths and how they work.

A-3 Gear Box Fundamentals, Inspection & Repair Procedures

Tim Brockett • Artec Machine Systems

Gear Box Fundamentals & Applications, Modes of Failures and Preventative Maintenance Tips, Gearbox Inspection Techniques, Repair Procedures

A-4 Let's talk lift inspections.

Mike Nellis • State of Vermont

*What you can do to have a good inspection!
What inspectors look for? How many on staff and what it takes to become an inspector? How each state deals with New Lifts, Modifications, Write ups, etc?
Bring Your Questions!*

A-5 Leitner-Poma of America

Customer Service Round Table

3-Hour Class

Rod Stocking • Leitner-Poma of America, Inc.

*Panel With Patty and Kuseno
Leitner-Poma of America would like to provide our customers the opportunity to discuss problems, concerns, procedures and Ideas for improvement. This open forum discussion will be conducted By Rod Stocking, Leitner-Poma of America Service Manager. Rod requests everyone come prepared with your questions, comments and ideas for this 3 hour secession. This is your chance, don't let it pass you by.*

A-6 Maintenance in the Ski Area - the real relationships and dependencies within the ski area

Bob Ackland • Steep Management, LLC.

Audience should be those with supervisory responsibility. Attendees for Maintenance in the Ski Area will get a sense of relationships and dependency with and on others in the ski area for success and see the relationship of maintenance with the outside factors that impact their work as well as factors that impact the total performance of the ski area. The class will develop the relationships of a maintenance task/ position up through the workings of the ski area. This will be done using functional relationship mapping to visually connect the dots. Audience should be those with supervisory responsibility. Attendees for Maintenance in the Ski Area will get a sense of relationships and dependency with and on others in the ski area for success and see the relationship of maintenance with the outside factors that impact their work as well as factors that impact the total performance of the ski area. The class will develop the relationships of a maintenance task/ position up through

the workings of the ski area. This will be done using functional relationship mapping to visually connect the dots

A-7 Introduction to Wire Rope

Sam Geise • Geise Engineering

*Terminology, constructions, use;
How wire rope is made: Basic Inspection & Math (Broken Wires, etc) MRT;
ANSI B77 Requirements.*

A-8 Understanding The Stages Of Snowmaking Automation:

Ian Jarrett • HKD Snowmakers

Understanding The Stages Of Snowmaking Automation: Please join HKD Snowmakers in peeling back the various layers that make up system controls, monitoring and snowmaking automation. This class will be "hands-on", "on-hill" and structured to provide the tools to identify, evaluate and implement the degree of snowmaking automation technology that is best for your mountain and its operational objectives. "One size does not fit all".

A-9 LEGENDS OF THE FALL: Now what ? Hands-on Fall Rescue Training

Tony Kowalski • HoliMont Ski Area

Your Area may be up to speed on Fall Protection, but how much thought has gone into developing a rescue plan should a fall occur? This session will address how to develop a written rescue plan that satisfies ANSI and OSHA requirements. Topics will include: Suspension Trauma, types of rescue equipment, hands-on scenarios and how to properly inspect your Fall Protection and Rescue equipment. This class will be presented outdoors at a lift. Bring your own Fall Protection/Resue equipment for inspection and discussion

B-1 Multi-meters - Understanding what they can tell us.

Andy Pierce • Skytrac, Inc.

One of the most important pieces of equipment you will use is your multi-meter. Andy will introduce you to the various types, the right one to use for the job, and how to do it properly. Bring your multi-meter and let Andy show the proper techniques as you walk around circuits.

B-2 Basic Electrical Circuits - Part II

Bruce Wyamn • S-K-I Electric

We will begin by understanding the terms used in electrical theory, and understanding the relationship of Voltage, Current, Resistance, and Wattage. We will then move on to the three fundamental electrical circuits, Series, Parallel, and Series/Parallel to begin to understand circuit paths and how they work.

B-3 Sunkid Wonder Carpets

Maintenance, Operation, and Troubleshooting

Conor Rowan • Star Lifts, USA

*Panel with Pete Kavanagh; Dan Etman - Green Mountain Control Systems
The class will cover all things Sunkid Maintenance, Operation, and Troubleshooting.*

B-4 Concerned About Aging Lifts and Other Mechanical Equipment?

Neville Sachs, P.E. • Neville W. Sachs, P.E., PLLC

Many of our ski lifts are over thirty years old and much of our other machinery is aging. This presentation reviews the common causes of mechanical deterioration, including corrosion, what we can do to prevent further degradation, and some steps we can take to improve their mechanical reliability. There will be comments on the effect of corrosion and also data on the safety and planning benefits of predictive maintenance. Level II

B-6 Lift Evacuation Plans - What Changed/New? Is your plan up-to-date?

Mary Davis •

B77.1-2017 has changes in the evacuation requirements. This session will address what has changed (and why) along with self assessment of evacuation plans

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B-7 Basic Ski Lift Math and Physics

Ross Stevens • Stevens Engineering

Bring a simple calculator + -/SQ Root (Check your cell phone)*
Presenting practical math applications for ski lift technology including photos, formulas and sketches of the basic things you need to know about. Your opportunity to ask questions, discuss concepts and understand fundamentals. This course is for anyone who wants to know more about an important tool we use every day and including mechanics, supervisors, inspectors and authorities. Bring any math issues you want to discuss.

B-8 TechnoAlpin Fan Gun Summer Service

Stuart Clotworthy • TechnoAlpin USA, Inc.

Aimed at service technicians working at ski areas, no special tools required.

C-0 Jiminy Roundtable

Little Shop

Michael Lane • National Ski Areas Association

Michael Lane, and others from insurance, authorities, and maintenance personnel. The year in review! What went "right and wrong," trends that have been noticed concerning Ropeways, and the people who maintain and operate them.

C-1 DC - Electric Motors for the Mechanic

Karl Butz • Troy Industrial Solutions

Prior to the introduction and increase use of VFD's, the Direct Current (D.C.) motor was the motor of choice for infinite speed control of small and large Lifts. An overview of the characteristics of D.C. motors, the construction, operating parameters and recommended maintenance will be presented. Discussion will also include the myths of continuing to use a D.C. drive.

C-2 Bearing Protection for Electric Motors &* Reducing Downtime

Tom Leunig • Helwig Carbon Products

We will present a solution to pre-mature bearing failure in AC and DC electric motors, especially when used with drives. Motors controlled by drives save energy, but they also create induced shaft currents that will discharge through the bearings and cause expensive downtime. Attendees will learn about this problem and a low cost and effective solution that will save money from costly motor repairs and ski area downtime. Audience: Lift maintenance personnel involved with electric motor/equipment maintenance & repair. Maintenance Managers.

C-3 Drive Machinery Components - Design Characteristics, Failure Modes, Maintenance

Paul Ehlert, P.E. • Doppelmayr USA, Inc.

This class discusses couplings, solid and U-joint drive shafts, backstops, bearings, belt drives and other rotating drive machinery. It covers the functions of various types, why the designer chooses one over another, their failure modes, maintenance requirements, alignment specifications and repair or replacement procedures. Bring your questions or examples of what you have experienced and we will discuss trouble shooting possibilities.

C-4 Conveyor Safety - During Maintenance and Operations

Sam Geise • Geise Engineering

Panel with: Conor Rowan, Sam Geise, Ross Stevens and Michael Lane - Changing our culture with respect to Conveyor Safety
Conor Rowan - Star Lifts
Pete Kavanagh - Star Lifts
Audrey Paulus - Magic Carpet Lifts
Sam Geise will facilitate this session. Conveyor Safety and how to implement protocols, best practices, procedures to reduce the risks to maintenance and operational personnel is the main focus of this session. To many people are getting injured while performing maintenance and routine operations on these installations

C-5 Falls from Lifts - Panel forum Discussion

Mike Nellis • State of Vermont

Panel w/ Jack Savasta (State of Vermont), Briggs Lockwood, Jason Perl, Brooke Kasman

C-6 Practical Applications of Bearings in the Ski Industry

Steve Greene • Action Bearing Company

Lifts, Groomers, Pumps, compressors, Etc. all have bearings. This will be a dialog based discussion on bearing applications in the ski industry. Bring your questions, and stories from the field for sharing.

C-7 Lift Maintenance Resource Guide, How can this HELP?

Michael Lane • National Ski Areas Association

LMRG – this is a combined effort led by NSAA utilizing experts within the industry to develop a guide for areas to use to help identify and develop individuals in Lift Maintenance. The resource guide is currently 18 chapters and about 100 pages long and covers all facets of lift maintenance from rigging, brakes, safety, Low voltage, Motors, drives etc. and is broken out into level I, II, and III knowledge levels (not certification – but knowledge/understanding levels). It is a guide and was initiated at the request of the NSAA Exec Board. The guide is nearly the end of it's 3rd round of edits and will be discussed and commented on this winter, then final round of edits in spring and summer with a completion and release time frame of fall 2019.

C-8 Using Metrics to Improve Maintenance and Staff Engagement

Bob Ackland • Steep Management, LLC

Audience should be those with supervisory responsibility. Attendees will understand how they can deepen the engagement of their staff to take ownership of their work. The value of metrics will be discussed as tool to engage in a positive way with their staff to enhance retention probabilities and to increase the overall productivity of the maintenance department.

D-1 Variable Frequency Drives (VFD's)

Bob Twohill •

Poly-phase (3Ø) motors are used in all aspects of today's ski area operations. Increased usage in speed control applications for Lifts, Snowmaking, and Building HVAC applications make understanding the basics useful. Discussion will center on the construction and operation of VFD's. Bob will explain the theory of operation, application, and installation parameters of the VFD drive. He will discuss with you the advantages and disadvantages of using a VFD and possible pitfalls.

D-2 Transformers Part I

Bruce Wyman • S-K-I Electric

These classes will help you understand the different styles of electrical transformers, you might find in you installations. Discussion will include single phase, three phase, wye connected, delta connected transformers, as well as Potential Transformers, (PT's), Current Transformers (CT's), and control transformers.

D-3 Fixed Grip Migration, Jaw and Rope Marks – The Good, the Bad and the Ugly

Paul Elhert • Doppelmayr USA, Inc.

Migration of fixed grips is a source of concern for lift operators. What causes the grips to migrate and where does it occur? What about the safety factor of 3 to slippage? Why is the amount of migration different on various installations? How much migration is too much? What if the grips don't migrate at all? What damage can be done to the wire rope by migrating grips or lack of migration? What can I learn from the marks the rope leaves in the grip jaws? Should I be concerned about those marks? This class addresses all of these questions along with some interesting examples of good, bad and ugly migration. Come with questions to ask and discuss

D-4 Ski Area Lubrication - Where we've been and where we should be Going

Neville Sachs, P.E. • Neville W. Sachs, P.E., PLLC

The class will show how lubrication works, starting with base oils and additives. then describe the lubrication of different types of bearings and sliding surfaces and the effect of contamination. After reviewing those basics, it will cover the changes in lubricants including the various synthetic oils and the grease thickeners. The last portion of the program will discuss setting up a lubrication program with suggested relubrication periods and storage practices.

D-5 Hydraulic Controls Brake and Tension -3-Hour Class

John Schilly • Skytrac Inc.

Panel with Andy Pierce
Part 1 - Training on Hydraulic Components, Assemblies, Diagrams, Troubleshooting and Theories for Brake and Tension Systems. Part 2 - Finish any topics not completed and the a troubleshooting roundtable. Please bring your questions and experiences.

D-6 The Fundamentals of Fasteners

Michelle Pesanelli • Bolt Depot

Michelle Pesanelli, Jason Bourque, and Paige Mathewson
The Fundamentals of Fasteners is an introduction to identifying and sizing threaded fasteners. Students will learn the importance and distinction of different fastener types, materials, and sizes. We will cover how to size fasteners and how to recognize the difference between US and Metric sizes. Attendees will receive complimentary Bolt Depot thread gauges and a copy of The Fundamental of Fasteners.

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D-7 Potpourri for \$500 Alex - What inspectors and peers wish you all knew.

Michael Lane • National Ski Areas Association

This session offers a variety of topics that touch on things that your ropeway inspector and many other experts wish everyone knew and/or implemented. Everything from why wind does what it does to brakes, pre-ops and operation logs, maintenance records, ramps, and ownership for example. Attempting make sense of a few things that are important.

D-8 SMI Spring Time Maintenance

John Parker • SMI Snow Makers

Tips and Tricks for everyday trouble shooting and repair. Panel Discussions with Dan Triantafillou.

D-9 LEGENDS OF THE FALL: Now what? Hands-on Fall Rescue Training

Tony Kowalski • HoliMont Ski Area

Your Area may be up to speed on Fall Protection, but how much thought has gone into developing a rescue plan should a fall occur? This session will address how to develop a written rescue plan that satisfies ANSI and OSHA requirements. Topics will include: Suspension Trauma, types of rescue equipment, hands-on scenarios and how to properly inspect your Fall Protection and Rescue equipment. This class will be presented outdoors at a lift. Bring your own Fall Protection/Rescue equipment for inspection and discussion

E-1 Selecting the right Fuses

Christina Rosati • Eaton Bussmann Fuse

E-2 Transformers Part II

Bruce Wyman • S-K-I Electric

With the increased use of airless snowmaking, and power company variables, some Ski areas are having to upsize their Secondary Distribution System. We will discuss the different type of Transformers, sizing, connection styles and general over-all usage.

E-3 Magic Carpet Manufacturers Session

Dave Kelly • Magic Carpet

Magic Carpet Manufacturers Session - the nuts and bolts of MC Conveyors and ask the technical questions. Dave Kelly, Audrey Paulus and Sam Geise of Magic Carpet

E-4 Failure Analysis of Ski Area Mechanical Equipment - Looking primarily at shafts, fasteners, and bearings

Neville Sachs, P.E. • Neville W. Sachs, P.E., PLLC

After a brief review of the difference between physical, human and latent roots (causes) of failures, the class goes into detail about how to diagnose the physical causes and includes a number of hands-on examples. Much of the class is a review of a selection of ski area failures and how their diagnosis can lead to preventing additional equipment problems. Students are encouraged to bring failed parts to the class for hands-on analysis.

E-5 Hydraulic Controls Brake and Tension-Part 2 -3-Hour Class

John Schilly • Skytrac Inc.

Panel with Andy Pierce

Part 1 - Training on Hydraulic Components, Assemblies, Diagrams, Troubleshooting and Theories for Brake and Tension Systems. Part 2 - Finish any topics not completed and the a troubleshooting roundtable. Please bring your questions and experiences.

E-6 Advanced Torque Training

Joel Greene • Snap On Industrial

In this presentation we will go over the history of torque instruments, proper torque application, and choosing best tool for the job.

E-7 Advanced Ski Lift Math and Physics

Michael Lane • National Ski Areas Association

no calculator needed - over view and design understanding. The class contains a brief refresher on simple lift calculations such as capacity, speed, intervals, then moves to understand why certain Lift configurations are more costly, then expanding to what actually happens in the design process. The 201 and 301 Class for Lift Math - an overview w/ enough detail to get you thinking.

E-8 The Growing Value of Chairlift Surveillance

Ryan Lavoie • Peak Resorts

This session will dive into specific operational considerations when adopting and using video surveillance with chairlift operations at loading or unloading areas. We will discuss the infrastructure considerations, the costs, the training benefits, and ROI on investment—particularly with guest complaints or injuries. The use of surveillance is growing at ski areas across the country, not just with lift operations, but summer activities as well (zip lines, coasters, etc). We will highlight examples of video surveillance from across the country to underscore the impact it can have with operations, training, and litigation, and discuss new tax law benefits that make video surveillance even more inexpensive.

F-1 Arc Flash Prevention and Protection

Jim Lanz • Horizon Solutions

Identifying ArcFlash hazards - NFPA 70E and what to do next and to protect yourself.

F-2 Lightning/Surge Protection & The Coordination of Technologies -

Bill Purcell • MeterTreater, Inc.

This presentation is geared towards electrical lift maintenance personnel and reviews the applications of Surge Protection as it relates to issues associated with operating electrical systems in real world environments. Material covered will provide insight on what to protect, how to select the technology/protector and where to interface/install with specific emphasis on application coordination. Discussions will include lift operating systems, drives, proximity (PROX) switches, weather instrumentation, security systems (access control, video & alarm), plus computers and communications networks. Grounding and bonding principles will be reviewed due to their critical relationship to system performance and personnel safety

F-3 Investigating and Documenting Lift Incidents

Dylan West • MountainGuard

his class will discuss lift incidents and review forms and documentation. We will look at photos, diagrams, and other pre- and post-loss documents. The Class will interview the lift attendant and witnesses to learn "the whole story". Discussions and field session lead by Dyland West and Jesse Whitcomb.

F-4 Introduction to Brakes - 101

Chris Hanrahan P.E. • Alpine Shield

This class will look at the different types of brakes, their physical characteristics, components, nuances, and adjustments. The session then applies the different brake types as they are used on ropeways and attempts to give an overview to help you understand their operation and how they relate to the requirements of the B77.1 Standard.

F-5 Adaptive Evacuation Workshop

Mary Davis • ASC B77 Evacuation Subcommittee

Review of the "common adaptive equipment", interfacing it with resort evacuation and the ANSI/RESNA Standard. This session will include hands-on with adaptive equipment and demo of evacuating skiers using adaptive equipment as well as an opportunity to share adaptive evacuation procedures at various resorts. NOTE: Held at the Detachable chairlift outside of JJ's Lodge.

F-6 Lift Operations Round Table

Andrew Lampron • Mount Snow Resort

Andrew Lampron and Jake Roberts of Mt. Snow will lead the discussions and will include everything from daily operations and risk management to training and employee retention. Participants are requested to bring thoughts and ideas of things that work well from their own operations as well as current challenges faced. Discussion will be informal with a focus on audience participation

F-7 Tubing - What you need to know.

Sam Geise • Geise Engineering

The class will cover: Site location, slope profile, the different transport options, techniques to slow and stop tubes, releases and how to reduce mishaps in your operation. Conveyor Design, Hazard Analysis, Maintenance, Safety, Operation, and Troubleshooting.

G-1 Lock Out Tag Out - Proper Procedures

Jim Lanz • Horizon Solutions

The class will review the proper procedures for Locking out and Tagging out your equipment.

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G-2 Reading Schematics -- The How Too?

Andy Pierce • AP Electrical Service, LLC

Navigating the unknown has never been so simple. Learn how to follow the electrons through your panels using the Google Maps of lift controls. Bring your schematics and lets go through them. Better yet - email them to andyp@skytrac.us or bring electronic copy.

G-5 Operational Impacts of changes in ANSI B77.1-2017 on fixed and detachable Chairlifts

Mary Davis •

What's New and what has changed in the operational and signs requirements since the approval of ANSI B77.1-2017 Ropeway Standard. This session will update attendees on changes that will affect all lifts, not just new installations, major modifications, or relocated lifts.

G-6 Pre Operational Inspections-What they are and what there not.

Chris Hanrahan P.E. • Alpine Shield

Review of pre-operational inspections of ropeways for both summer and winter use. An overview of what the ANSI requirements are, what they mean and why they are important. Will cover how they should be implemented, documented and applied at your area! Discussion of what works and what doesn't!

G-7 Spark Ignition Engines- Keeping them in peak condition.

Larry Wollum • All Ski Lifts

Air Cooled / Liquid Cooled / Clutches / Torque Converters and Reduction Units - No tools required. There is getting to be a noticeable decline in knowledge of the older gasoline/Propane/Natural gas engines and appurtenances as lifts get older. We want to refresh lost memories on this subject. Will also talk about various fuels and their differences.

G-8 Snowmakers Symposium

Dave LaCombe • Killington Resort

This is an open discussion where snowmakers can learn, discuss, and swap information on all aspects of slope maintenance.