



See the Light on LED Signals

April 2007





Is LED Technology in the Rail Industry a Snowball Out of Control?

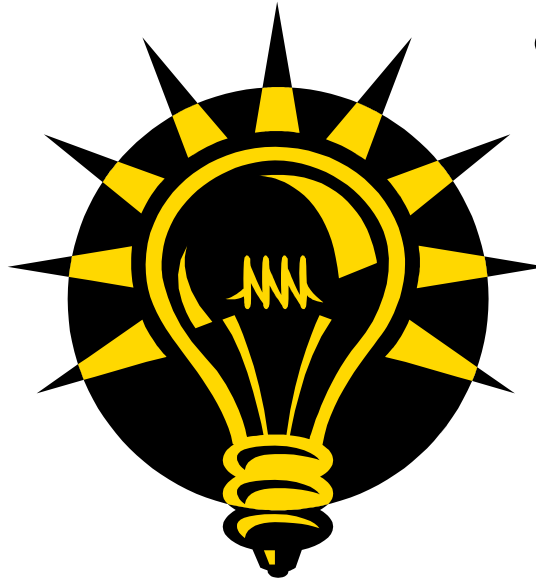




Why Did We Want to Change in the First Place? What's Wrong with a Light Bulb Based Signal Anyway?

Fragile - Glass &
Filament

Intricate Lens Systems
(30-15, 20-32, 70)



Difficult to
Align and Focus

Single Point of
Failure

Short Life





Why Use LEDs?

Reliability/Durability

- Exceptionally Long Life
- Graceful Degradation
- Longer Time on Battery Back-Up
- Less wear and tear on flasher contacts
- Solid State Device - More rugged than incandescent bulbs and reflectors

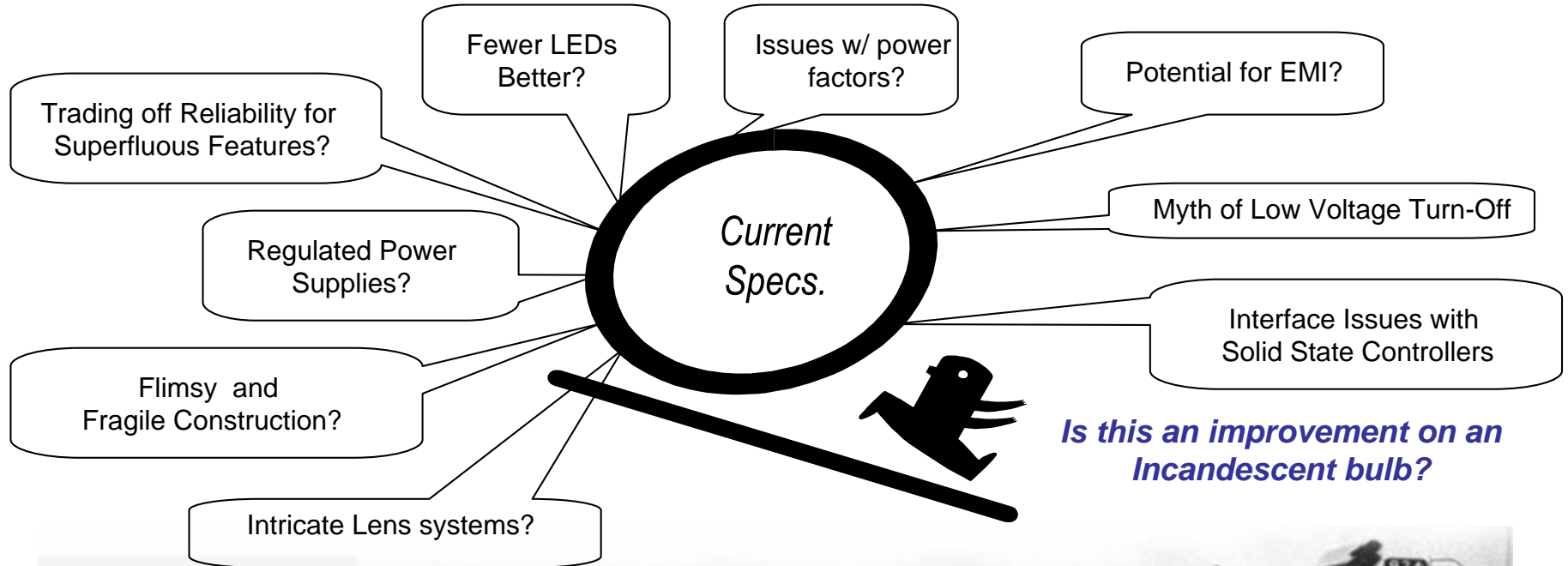
Superior Performance

- Very forgiving relative to aim and alignment
- No more phantom indications
- More visible - saturated light source





LED Specifications Have Begun to Snowball Are We Creating More Problems than We Are Solving?

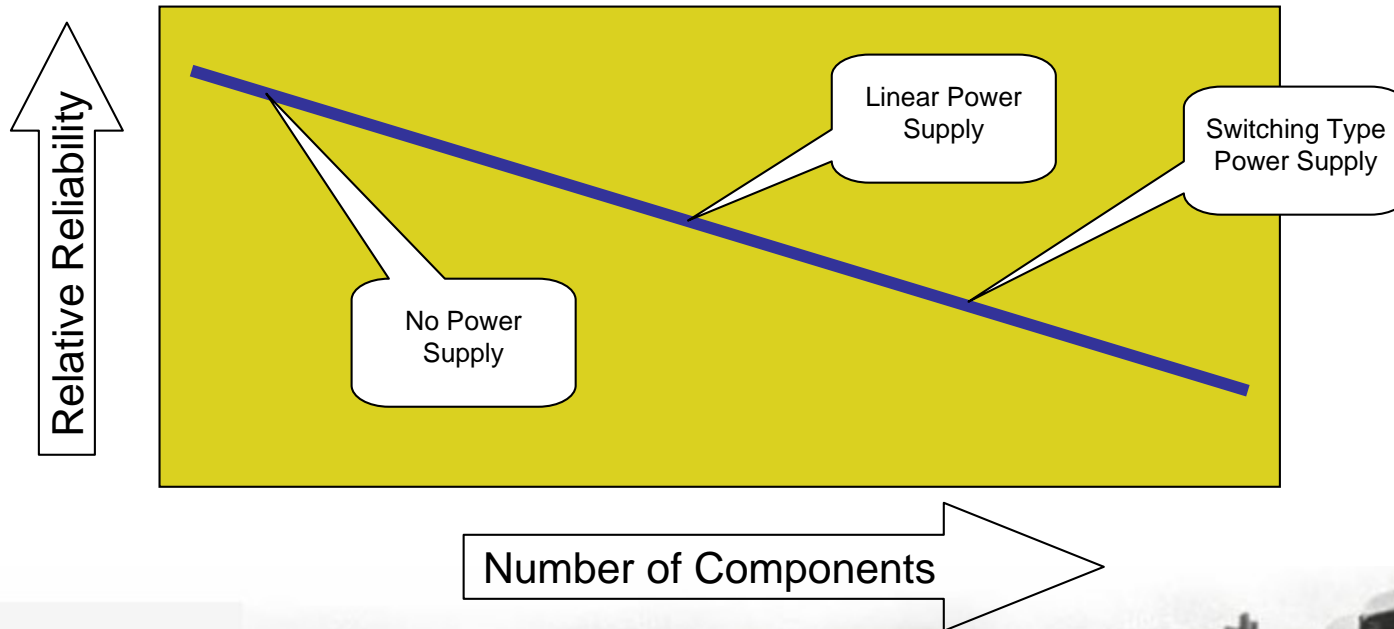


Is this an improvement on an Incandescent bulb?





Reliability of LED Signals





How Do they Stack Up?

Product Benefits	Measurement	EVERRAY	Alstom Electro-tech's	Safetran Dialight	GELcore
Reliability/Durability					
Exceptional Long Life (MTBF)**	MIL STD Analysis	1,476,000	361,900	182,200	122,359
Exceptional Long Life	# of Components (Non-LED)	16	28	28	73
Graceful Degradation	Min. LED Loss	0.64%	6.25%	50.00%	0.70%
Worst Case Failure %	FMEA	7.7%	100%	100%	100%
Longer Battery Back-Up Time	Hrs. from 250 AH System	263 Hrs.	206 Hrs.	151 Hrs.	151 Hrs.
More Rugged	Lens Thickness	0.25 In.	0.12 In.	0.1 In.	0.1 In.
Superior Performance					
Forgiving to aim	% of Light outside of 50°	24%	12%	8%	22%
Forgiving to aim	Widest Viewing Angle	Widest	Narrow	Narrowest	Wide
Lower Current Draw	Current Draw at 10V	0.85 A	1.2 A	1.7A	1.7A
Fewer Phantoms	Based on Construction	Excellent	Excellent	Poor	Poor
Improved Visibility	Visual vs. Incandescent Bulb	Good	Good	Good	Good





Reliability of EVERRAY

Product	Reliability Analysis (MTBF)
1607-508-02 RDG Signal with linear power supply	946,022 hr. Using MIL-HDBK-217 analysis
1607-508-04: RDG signal with current limiting resistors*	1,476,362 hr. using Using MIL-HDBK-217 analysis
1607-400 – installed base of 28,000 units over 6 years	12,700,000 Hours (based on field history)





The EVERRAY Products

Product	LED Power Source	Active Side Lights	Comments
1607-508-02	Linear Regulated Power Supply	YES	Meets Transport Canada
1607-508-04	Current Limiting Resistors	YES	Largest installed base of any LED crossing signal





EVERRAY Specifications

Part Number	1607-508-04	1607-508-02
Product Description	12 inch crossing signal light unit with side lights	12 inch crossing signal with side lights, driven by linear power supply
Operating Voltage	8 to 14 V AC or DC	8 to 18 V AC or DC*
Current Draw	0.85A @ 10VDC	.9 A @ 10VDC
Drive Circuit	Current limiting resistors	Linear power supply
Viewing Angle	Universal: Replaces 30/15, 20/32, and 70 degree roundels	
Temperature Range	-40 C to + 85 C	
Reliability (MTBF)	1,476,362 Hours	946,022 Hours
Lead Wires	14 AWG	