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Electro-Luminescent Display(ELD) Systems for the Cave Illumination

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Abstract : Electroluminescent Display(ELD) will be the innovative ideas to replace existed electricity illumination systems that consider to under effectiveness and environmental pollution generators in the commercial caves because ELD has less heat and low electricity consumption by the new illumination materials. Characteristics of the ELD are as following: it is a proper matter for the small merchandise ads due to its thickness is only below 3oo micoron, electricity consumption of ELD is less (1/3) than LED, ELD that is a whole face illumination system is much brighter than LED that is a dot illumination system, ELD is longer life than others due to its less light generation systems, ELD is any problems to bend, and it is a best device to use a light board ads. ELD has advantages on conservation of cave biosystems and reduce pollution when ELD is installed in touring spots and emergency corridors of weak illuminated cave internal areas by less heating and low electricity consumption using the indirect illumination of the ELD. Therefore when the high technologic ELD is installed in the commercial caves in Korea, it will be innovating cave environmental systems, saving budgets, and increasing tours.
Key Words : Electro-Luminescent Display(ELD), cave illumination

I. Introduction

ELD (Electroluminescent Display) is indirect illumination systems which can be used for the useful cave illumination instead of general light bulb systems. When ELD installed in cave tour corridor and emergency passages, it is fact that to reduce cave contamination and to protect cave eco-systems. It is eventually innovated cave environments because of lowing heat effect and lowing electricity expenses from ELD

A. ELD will be installed in as following spots in caves:

- cave special creatures
- cave directions
- cave storages
- cave protective formations
- cave emergency passages
- cave entrances
- cave tour courses
- cave informations
- cave miro
- cave hydrologic systems
- cave fragile matters

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- cave mining remnants
- cave exit and etc.

B. ELD (Electro-Luminescent Display) Systems

ELD is a great affect for the small sized product adv. because of thinness (<300micron). ELD's consuming electricity shows 1/3 less than luminescent diode. ELD supply very evenly lightnings due to entire luminescent systems than the LED's dot luminescent systems. LED is not only a very long life due to less heat generation than any other lighting systems but also it does not have any damage when it bands. Spacially LED can best fit for the pennell type adv. matters.

The potential of ELD technology is immense. Any artwork can be illuminated as per specifications. The panels can be illuminated to virtually any collections. The shape and size of the panels are also customizable. portfolio of custom built designs includes large scale art installations, theatrical set designs and signs and displays for commercial establishments. ELD technology backed advertising tools are all set to outweigh expensive, high energy consuming products.

The Electro-Luminescent Display Technology technological acumen revolves around the ELD technology. The technology brings a thin, yet captivating light screen giving an entirely new dimension to brand-building advertisements. Technological acumen revolves around the Electro-Luminescent Display technology. The technology brings a thin, yet captivating light giving an entirely new dimension to brand-building advertisements.

C. Products on offer are:

- Electroluminescent Wires
- Electroluminescent Strips
- Electroluminescent Sheets
- Sequence Animated EL Display
- Sound effective Animated Display
- Movement Sensing / IR Reflective Sensing
- Reflective Sensing EL display

Ⅱ. Products

1. Electroluminescent Wires

Electroluminescent wire (EL wire) is a thin beam of light based on the technology

of electroluminescence. It is the world's one-of-a-kind light available in the form of a wire in numerous colors and diameters. The lengths of the light beams can vary from a few inches to a few thousands of feet. This great light can be harnessed for crafting aesthetically appealing things. You can light up virtually anything from doors and tables to clothes and enjoy the cool glow.

Figure 1. Electroluminescent Wires

A. Specification

- Brightness: The light is bright enough for decorative purposes. You can increase or decrease brightness by increasing or decreasing voltage. The typical brightness is 70Nit (800Hz, 100V)

- Handling: El wire is available in spools containing 250m of wire length.

- Lifetime: The life of El wire is dependent on frequency and voltage inputs. Though you can get higher brightness by subjecting the wire to higher frequency and voltage, its life gets shortened.

B. Two rough estimations:

- When wire is continuously subjected to a frequency of 60 Hz and a voltage of 110V, the estimated lifetime will be about 25,000 hrs.

- When wire is continuously subjected to a frequency of 2,000 Hz and a voltage of 120V, the estimated lifetime will be about 1,000 hrs.

2. Electroluminescent Strips

HOML supplies EL lighting in the form of strips. They come with matching power packs. An EL strip is a linear light in the form of a strip with an average thickness of only about 0.020Ó. The length of the strips vary from a few inches up to 480 ft. The width varies from ¼ inch up to 30 inches. HOML EL strips come with standard widths of ¼, ½, 1, and 2 inches, although they can be customized as per requirements. The brightness, which is directly

proportional to voltage, is more than adequate for accent lighting and interior decors.

A. Superiority of EL strips over neon, LED and fiber optics:

An EL strip is more energy saving than its competing products. It is less expensive and easy to install. It is ultra thin to suit various requirements and is cool to touch. The strips are available in continuous lengths and can be supplied as per requirements. The strips can be powered by batteries or electrical outlets.

Figure 2. Electroluminescent Strips

B. Other features:

All panels supplied by HOML are fully encapsulated. The panels have two base colors - white and aqua. Can be produced with overlays having colors- blue, green, red, orange, purple and gold. The standard delivery time for EL strips is 3-4 weeks. The lifetime of the product depends on frequency and voltage inputs. You can get higher brightness with higher frequency and voltage, but the life gets shortened. Fortunately the decay process is gradual and you can enjoy light for a much longer time. You do not need any special professional training to install EL strips. Only some training from . side, some tools and ordinary electric outlet will suffice.

3. Electroluminescent Sheets

HOML supplies EL sheets in the form of panels. The panels are ideal for advertisement billboards, kiosks and safety storages. They are fully encapsulated and come with matching power packs. They are available in two base colors- white and aqua. The panels can also be produced with overlays having colors of blue, green, red, orange, purple and gold.

The EL sheets are actually extremely thin lamps with thickness as low as 0.17mm. The size of the EL sheets varies from less than a stamp up to A1. We also cater to

the other European size requirements A2, A3, A4, A5, A6 and A7.

Figure 3. Electroluminescent Sheets

A. The following are the salient features of . EL sheets:

- They are affordable
- They are energy-saving and easy to install without any specialized knowledge
- They come in several sizes to suit y. needs
- They have tremendous visibility- even in haze, fog and smoke
- They can be powered by either batteries or home electrical outlets
- They are cool to touch
- They provide uniform illumination irrespective of their size
- They save space

The standard delivery time for EL sheets is 3-4 weeks. We can also supply screen printed EL sheets if the required quantity is considerably large. In that case the delivery time will vary between 3-8 weeks. The standard brightness of . EL sheets is 50 cd/m2 under 100 v power supply with a frequency of 400 Hz. The life of the EL sheets depends on the applied voltage and frequency. With higher the voltage and frequency, the life of the sheet gets shortened. The decay process is very slow and you can continue to get light for a long time- even the life expectancy can exceed more than 20,000 hrs.

Ⅲ. Applications

Electro-Luminescent Display (ELD) products have a wide range of commercial applications- both in the industrial and personal segments.

Major Applications:

- Billboards, Signs & Retail Displays
- Retail Accessories & Corporate Merchandise
- Entertainment Industry

- Architecture & Decor
- Safety Lighting

1. Billboards, Signs & Retail Displays

EL billboards, signs and retail displays are the most preferred modes of brand-building these days. Their visual attractiveness is unparalleled. They are highly affordable and easy to maintain. They are far superior to neon lighting. If you wish to inject that extra zing into y. outdoor campaign, you should bank upon . EL display products. We can get any amount of EL displays and special investors provide uninterrupted illumination.

A. Potential uses:

- Road signage
- Vending machine displays
- Point-of-sale advertisements
- Illumination of nightclubs and pubs
- Brand building displays in public fairs and exhibitions
- Illuminated advertisements in cars and buses

2. Retail Accessories & Corporate Merchandise

EL products are a perfect answer to any sort of ideas you might have to promote y. merchandise. You can also make . EL products integral with y. line of products, say, white goods, electrical components or computer peripherals. Imagine a tent that is illuminated and can be seen from miles away in darkness. Such innovative applications are possible with . range of EL products. There is no chance to lose sight of y. tents and y. trekking will be free from any worries.

A. The tent kit includes:

- A battery power pack
- 2 x 1.5m lengths of EL Wire
- 10 x cable ties
- Pouch
- 4 x AAA batteries

You can give y. personal play station a new life with . EL wires. You can easily place the wires into the groves of the play station. X-box illumination kit is available in blue, aqua, lime and red. The battery can be switched on to continuous or flash modes. The kit includes:

- A battery power pack
- 1 x 1.2m lengths of EL Wire

- Instruction manual
- Superglue
- 2 x AA batteries

You can give y. bike a new seductive look with . bike kit. The EL wires wrap around the frame and forks of y. bike, giving it an attractive glow. The available colors are- red, aqua, blue, pink or white. Whenever you ride on y. bike, the glow signals y. dazzling personality! The bike kits have become very popular with mountain bike racing teams. This kit includes:

- A battery power pack with 4 outputs
- 2 x 1.5m lengths of EL Wire
- 10 cable ties
- Pouch
- 4 x AAA batteries

However, please be cautioned that the kit is not an alternative for bike lights. Other applications of EL wire kits can be:

- Decorating bedrooms
- Giving y. costumes a new look
- Making y. schoolbags more attractive

3. Entertainment Industry

EL display products are a great boon for the entertainment industry. EL wires, strips and sheets allow you to create lighting designs as per y. choice with 360° illumination. Be it a set lighting, or a prop illumination or a special effect. EL products work wonders. Custom build, DMX designs and lasers: We can provide custom-made solutions comprising of a combination of EL wires, strips and sheets. The illumination pattern can also vary as per y. requirements- continuous, flash, strobe, sequence and DMX controllable animations. We have sold illumination solutions to several top notch television and film production companies, high profile theatres, operas and event management companies.

Nightclubs: EL wires, strips and sheets can cast a magical spell in nightclubs. When accompanied with DMX interface control units, you can get a wide variety of lighting options and animations. The following are some of nightclub applications:

- Prop designs
- Garments, costumes and outfits
- Stage constructions
- Set designs

- Illuminated backstage

4. Architecture & Decor:

Range of EL display products are capable of contributing handsomely to the beautification of architectural structures and also for interior decors. Designer customers globally have given shape to their imagination with the help of product range. The architects of shopping malls, theatre and cinema halls, and important buildings have used EL display devices to produce striking light effects. The visual effects of the lightings have often contributed to increased footfalls. The other positive effects are environmental safety and power savings.

5. Safety Lighting:

One of the emerging applications of HOML's EL display wares is safety and low level emergency lighting. The key focus in this category so far is safety garments. The HOML R&D team along with its Australian collaborator has developed a conceptual safety garment titled Wondersafe EL. The garments are electroluminescent, all-weather proof without any adverse effects. They are visible from great distance in night, thereby helping in rescue / evacuation process.

Company supplies EL panel incorporated jackets and waistcoats. Safety garment range includes:

- Garments for traffic and road use
- Garments for construction workers
- Garments for building security personnel and railway staff
- Garments for Policemen

Ⅳ. Services

Portfolio of custom built designs includes large scale art installations, theatrical set designs and signs and displays for commercial establishments. We have a vast expertise in the field of turnkey lighting projects and provide erection and commissioning services of the entire range of EL displays and equipments.

EL billboards, signs and retail displays are the most preferred modes of brand-building these days. Their visual attractiveness is unparalleled. You can also make EL products integral with y. y. Retail Accessories & Corporate Merchandise like white goods, electrical components or

computer peripherals.

1. Custom Built Designs

Customers play a crucial role in journey towards innovation. We always invite . customers to share their ideas with us. We believe that every idea can be translated to reality and . joy knows no bounds when we can achieve that portfolio of custom built designs includes large scale art installations, theatrical set designs and signs and displays for commercial establishments. Beyond the commercial world, Custom built designs reach out to hundreds of people each day. We give shape to the ideas of valuable individual customers. Be it a wedding decoration or illumination for a rooftop garden, we feel honored to be able to bring sparkles of joy in customers' lives. Policies of making . customers delighted make them come back to us again and again, each time with new and challenging requirements.

2. Turnkey Architectural Services

Partnership with APJ Projects Pvt. Ltd., a premier architectural lighting and interior décor company, has empowered us with vast expertise in the field of turnkey lighting projects. Some of . niche offerings in this field are:

- Illumination of buildings
- Illumination and decoration of shopping malls
- Illumination of hotels, restaurants and nightclubs
- Illumination of entertainment parks
- Illumination of interiors of movie and theatre halls

Apart from the above, we provide erection and commissioning services of the entire range of EL displays and equipments. We also offer attractive annual maintenance contract services to . valued customers. As part of after sales service, well-trained and competent technicians visit . customers' site to offer system maintenance along with guidance for lengthening the systems' lives.

V. Conclusions

ELD (Electroluminescent Display) is indirect illumination systems which can be used for the useful cave illumination instead of general light bulb systems. When ELD installed in cave tour corridor

and emergency passages, it is fact that to reduce cave contamination and to protect cave eco-systems. It is eventually innovated cave environments because of lowing heat effect and lowing electricity expenses from ELD.

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As shown by above features, ELD can be used not only cave internal illuminations and but also cave exterior adv. with the karst characteristics. Therefore ELD will support for the national innovative issue as the low carbon green growth.

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http://www.electroluminescentdisplay.com/products.html Website : www.homl.in

Appendix I:
Technical Specifications of ELD

SIGN MATERIAL	Multi-laminate construction
SIZES & SHAPES	Custom shapes available. Any size can be achieved by joining panels together
VIEWING ANGLE	>160 Degrees
APPLIED VOLTAGE	AC 50 Vrms to AC 220Vrms (For Split-Electro up to 350vac)
APPLIED FREQUENCY	50 HZ to 3 KHZ
INDOOR/OUTDOOR	Can operate in both environments
OPERATING TEMPERATURE	- 20 degrees ~50 degrees (Nor.) / 80 o (Max)
STORAGE TEMPERATURE	- 40C to + 85C
OPERATING HUMIDITY	0% ~ 90%
OPERATING CURRENT (100vrms/400Hz)	1.5~2.5 mA /sq.in
POWER RES.CES	DC 1.5V to 24V and or AC110/220V
POWER INVERTER	Different power configurations to optimize sign parameters
CAPACITANCE	2 - 5 nF / sq.in
BRIGHTNESS	35~130 cd / m2
THICKNESS	0.2~0.4mm (min 0.119mm For 2nd Generation Foil)
SAFETY	No Ultraviolet Radiation emitted
BEND RADIUS	0.25″ - Normal 2nd Generation Foil – Foldable
NORMAL EDGE SEAL	0.08″(2mm)
MIN. EDGE SEAL	0.03″(0.76mm)
LEAD PULLING	0.5kg 10sec.
LEAD BENDING	90 degrees 250gr bending 2 times
SOLDERING HEAT RESISTANCE	250 degrees 3sec>3mm distance from EL panel with extra force applied
LONGEVITY	10,000 -15,000 H.s depending on the lamps environment, driving condition and duty cycle
WARRANTY	6 month Factory Warranty for EL Signs, Displays and Inverters
TESTING	Environmental, Storage & temperature Shock Tests

Appendix II:
ELD colorful samples


Sound effective EL display

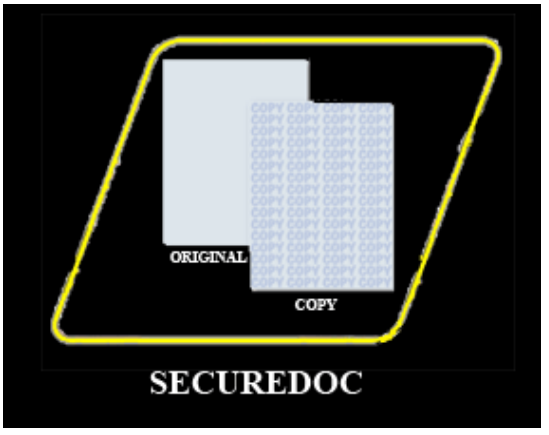

Mixes well with the finer things in life
Schweppes


You hold a special place in my heart


KINGFISHER
Chill with the
King of Good Times!


Coors
LIGHT


ROYAL CHALLENGE
Game for life!
Animated EL display


ORIGINAL
COPY
SECUREDOC


Coca-Cola
ELECTROLUMINESCENT
HOLOGRAPHICS
LENTICULAR