

# Building Your Own Bicycle Lights

In the 1st Session will discuss systems and provide opportunity for attendees to order a system

In the 2nd Session we will build up systems and attach to bikes

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# Importance of Good Lights

- Visibility to other road users - Front and Rear
- Ability to see your path and potential hazards
- Reliability
- Proper aiming
- Visibility against bright urban traffic background
- In-vehicle distractions to drivers are greater than ever
  - Cell Phones
  - GPS Navigation Screens
  - Video Screens
  - All make it harder for drivers to see dim light sources outside vehicle

# Who can benefit?

- Daily commuters
- Anyone who wants to ride after dark
- Anyone who rides under low visibility conditions

# Purpose of This Class

- Emphasize importance of adequate lighting system-whether commercially made or homebuilt
- Show how to build your own lighting
- Customize to individual requirements
- Learn how to keep it working
- Provide a build session to put everything together

# Typical Commercial Systems

- Rechargeable battery systems range from \$100 to \$900
- Non-rechargeable systems are usually not adequate for daily commuting under adverse conditions like rain, fog, or heavy traffic. Battery cost adds up over time
- Most do not come with taillight
- Headlight may be LED, Halogen, or HID
- LED's are getting brighter, but only most expensive models are bright enough to allow auto drivers to see you under urban traffic conditions
- Halogen systems come in several wattages, 20 watt and up are best for urban conditions. Many systems use special order bulbs - replacements are expensive and hard to get
- HID systems are extremely bright, but start at \$350. Probably not necessary for most urban utility cycling. Replacement bulbs are quite expensive.

# Why Build Your Own?

- Get more light and run time for less money
- Get much better taillight
- Get system that is harder to steal
- Can find replacement parts easily
- Mounting brackets will be more secure than commercial system
  
- It won't look as pretty as commercial systems
- It will weigh a little more than commercial system
- Lights will not have quick on/off attachment mounts
- Requires rear rack and bag to hold battery and taillight

# Choices for a Homemade System Batteries

- **Lead-Acid**
  - Cheapest
  - Heaviest
  - Available in many sizes
  - Two hour run time with charger will cost about \$35, weigh about 5 lbs
  - Three hour run time with charger will cost about \$40, weigh about 7 lbs
  - Needs a bag on rear rack to hold battery
- **NiMH**
  - More expensive(2X)
  - Lighter weight
  - Not as many sizes
  - More flexible mounting - small flat pack or waterbottle package
  - Two hour run time with charger will cost about \$60, weigh about 2 lbs
  - Waterbottle battery with charger is about \$95
  - Needs a bag on rear rack to hold battery (except waterbottle version)

# Choices for a Homemade System Taillight

- Taillight is built from Truck Trailer LED Stoplight
- Runs on 12 Volts
- Very bright
- Large size makes light more visible
- Visible from wide angles
- Rigid mount means it won't fall off on bumps
- Runs off same battery as headlight
- Waterproof and very reliable
- Constant on - does not blink
- Should probably carry a small battery blinkie as backup in case main battery goes dead while still on the road

# Choices for a Homemade System Headlight

- Our main system is a 20 Watt Halogen Spotlight
- Uses ordinary MR16 Halogen bulbs - buy them anywhere
- Housing is a driving light from JC Whitney, it comes with a 50 Watt bulb which is too much power for the small batteries we will use. We will replace it with a 20 watt bulb.
- Mounts to handlebar with a simple metal clamp - bolts on
- On/Off switch for headlight and taillight will attach to seatpost or nearest convenient location

# Complete System Parts

- Headlight - JC Whitney plus 20 Watt bulb \$20
- Taillight - LED Truck Trailer with mount to rear rack \$25
- Battery and charger
  - NiMH Flat package \$60
  - NiMH Water Bottle battery \$90
  - Lead Acid 4.5Ah \$35
  - Lead Acid 7Ah \$40
- Switch, connectors and wire \$10
- Totals: \$90, \$95, \$115, or \$145 based on battery choice

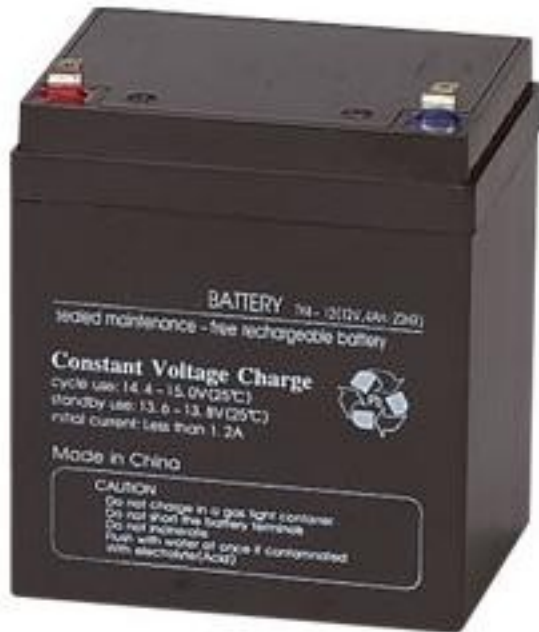
# Picture of Charger



# Pictures of NiMH Batteries



# Pictures of Lead Acid Batteries



# Picture of Taillight



# Picture of Headlight



# Sources for Parts Used

- Batteries [www.batteryspace.com](http://www.batteryspace.com)
- Headlight housing- [www.jcwhitney.com](http://www.jcwhitney.com)
  - Item # [ZX490430B](#)
- LED Taillight [stores.ebay.com/HVT-SERVICES](http://stores.ebay.com/HVT-SERVICES)

# Sources for More Information

- [www.bikeforums.net](http://www.bikeforums.net) - Commuting Forum
- <http://nordicgroup.us/s78/> - Lots of specific information on bike lighting systems