

ANTARES
engineering with answers

AAI Training Session 4

System Design Techniques and Round Up Session

Electrical engineering
solutions for
specialist vehicles and
remote locations

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Applying our Knowledge

- We now have a good overview of all the parts of the system
- Our job now is to create the complete auxiliary power system to meet the operational needs of the customer
- This may be just a part of or a complete system
- It must interface with other parts of the vehicle and between each of the components
- Finally we need to ensure that it meets, safety, environmental & statutory regulations.
- This is work Antares can do or support you with

System Design Techniques

- Power Balance Calculation
- Selection of components
- Installation kit design
- Battery Autonomy Calculations
- Electrical Losses
- Safety
- Environmental Protection
- Statutory Compliance

Power balance calculation

- This is usually a good place to start
- What power have we got? When is it available?
- What loads do we need to run?
- What are their voltages, frequencies?
- For how long and when?

Selection of components

- General Layout Schematic
- Component specifications – technical literature
- Ratings games played by salesmen
- Operational envelope of the vehicle
- Designing for worst case (think of insurance)

Installation Kit Design

- Engineering vs Crafting
- Whose scope of supply: AAI or Antares
- Component selection: fuses, cables etc

Battery Selection

- You will have noted that a 50A load on a battery will last more than twice as long as a 100A load on the same battery. (Autonomy tool)
- The actual capacity of the battery **does not change**, but the useable/accessible capacity does.
- Battery capacity is stated at different rates.
5hr/20hr/100hr (Example: 100Ah battery at the 100Hr rate is exactly the same as an 86Ah battery at the 20Hr rate)
- Battery size is stated as XXX Ah @ XX hr rate
- AGM vs GEL vs Flooded?
- What is VRLA?
- Other factors to take into account such as temperature/capacity/ageing
- "C" rate – discharging/charging

Electrical Losses

- Knowing electrical power losses is important!
- High system power loss means larger generators, more A/C, bigger battery banks
- You can minimise loss through...

Minimising conversion

Professional spec equipment > efficiency

Minimise cable runs, joins,

Careful connection design

Reduce waste energy by automation (PIR)

Safety Considerations

- All electricity is dangerous!
- However 56V is the accepted limit
- Risk of fire from overheating
- Exhaust fumes
- Each installation is different... if you need help...
- Source: Material Safety Data Sheets
- Source: Antares safety sheet
- Source: Antares engineering

Environmental

- Understanding the intended environment of an applications is a fundamental part of the system design.
- IP rating is the most common standard
- IP covers particulate and water ingress (not impact)
- Temperature and humidity considerations
- B,H,V (Bump Harshness and Vibration)
- Where a standard product is not available Antares has the capabilities and facilities to create specialist packaging to meet the environmental requirement.

Statutory Compliance

- This is becoming a key competitive issue
- WVTA (Whole Vehicle Type Approval)
- 17th Edition Regulations
- CE and “e” marking
- Low Voltage Directive
- EMC Directive
- Machinery Directive

Round Up Session

We would welcome a discussion and Q&A session on what we have covered (or missed) during the training.

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Thank you!

**We look forward to working
closely with you in the future.**

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