Railway Systems & Commercial Vehicles

Design and Production
History and Group Companies

1989
BBC & C
Salzgitter-Germany

1997
Bozankaya GmbH
Salzgitter-Germany

2003
Bozankaya A.S.
Ankara-Turkey
Graepel Bozankaya Ltd.
Ankara-Turkey

2005
Bozankaya USA

2007
Umbah Energy
Ankara-Turkey
Hydroelectric power plant

2010
Gebze-Turkey

2013
Hannover-Germany

Alfasolar®
Innovative Boxy systems
Bozankaya GmbH

Railway and Commercial Vehicles
Chassis / Carbody Manufacturing

GERMANY / Salzgitter - 1997
Bozankaya A.Ş.

Chasssis Production for Commercial Vehicles

TURKEY / Ankara – 2003
TCV
(Turkish Commercial Vehicles)
TURKEY / Kocaeli – 2010
Commercial Vehicles Design and Development Center

Graepel - Bozankaya
TURKEY / Ankara – 2003

Bus Component Producer
(Automatic Lift Systems, Door and Cover Production)
Assembly Area
TURKEY / Ankara – 2013
Assembly Area
TURKEY / Ankara – 2013
TCV

Stock Area
TURKEY / Ankara – 2013
Utilizable of Production Plants and Site

Sincan OIZ, 100,000 m²
TURKEY / Ankara – 2013
Quality Certificates

- **DIN EN ISO 9001:2008** - TÜV KÖLN Supplier for Automotive and Railway Industry

- **DIN EN ISO 3834-2** Welding Certificate

- **EN 15085 CL1** Welding Certificate for Railway Industry

- **GSI SLV DIN 18800-7** Welding Certificate for Railway Industry

- **ISO/TS 16949**
Partners
Railway Systems

- Carbody Production
- Tramcar Assembly
- Project Management
- Vehicle Design

MANUFACTURING EXPERIENCE OVER 1300 MODULES!
Stainless Steel & Aluminium Carbodies
Stainless Steel & Aluminium Carbodies
• Bergen
• Potsdam
• Bochum
• Mainz
• Graz
• Lyon
• Paris

• Portland
• Salt Lake City
• San Diego
• Houston
• Charlotte
• Norfolk
• Atlanta
Local Tramcar Manufacturing for Istanbul Ulasim A.S.
Design and production of jigs and fixtures for chassis – carbody production
Commercial Vehicles

* Body Production
* Vehicle Design & Production
TCV (Turkish Commercial Vehicles) has been established as a BOZANKAYA group company in 2010.

TCV is a young and dynamic company, to be displayed in the field of public transport, production and design.

TCV works for the public transport market. TCV behaves courageous for the development of innovative and creative product concepts and gives credence to customers!

TCV adopts as principle of work; Always quick, flexible and intelligent solutions for our vehicles. With this way, TCV can adapt to rapid changes and innovations.

Thereby TCV provides the following values to customers:

* Durable, robust and reliable vehicle structure
* Economic spare parts / maintenance costs / options that enable low fuel consumption
* Comfortable and safe travel experience you can take advantage of.
Sektörün yeni oyuncusu: Centravel

18 Nisan 2012, 11:31

Otomotiv sektörünün yeni aktörü TCV, 12 metre ile 9,5 metre segmentlerin avantajlarını tek bir bünyede bulunan, 10,7 metreklik araç Centravel'i Busworld 2012 Fuarı'nda görsüleye çıkardı.

Otomotiv sektörünün yeni aktörü TCV, 12 metre ile 9,5 metre segmentlerin avantajlarını tek bir bünyede bulunan, 10,7 metreklik araç Centravel'i Busworld 2012 Fuarı'nda görsüleye çıkardı. Tasarımları tamamen TCV tarafındanels olarak Centravel, firmanın yurt içi ve yurtdışı hedeflediği ürün gamının ilk versiyonu olma özelliği taşıyor.

Centravel Türkiye turunda

05/06/2012 - Erkan YILMAZ / GEBZE

10,7 metreklik otobüs kentçi ulaşımada beşeri toplayıcı Centravel, Türkiye turunu sürdürayor.

Kentçi ulaşımın yeni aktörü TCV, sektöre farklılık getiren 10,7 metreklik CENTRAVEL ürününün ileri beşeri beşeri toplayıcı, TCV, Busworld Fuarı'nda sergilediği 10,7 metreklik CENTRAVEL'in ardından, Temmuz ayında da 12 metreklik CENTRAVEL'i de pazara sunmaya hazırlanıyor.

TCV, Busword Fuarı'nda “Şehir Onu Konuşuyor” sloganıyla tanıttığı 10,7 metreklik CENTRAVEL, arabası ile hemen, hem de yabancı ziyaretçilere yoğun ilgiyi çekti. 

TCV Genel Müdürü Timuçin Bayraktar ile GEBZE Organize Sanayi Bölgesi'nde okul ve ofislerinde bir araya geldik. TCV'nin oluşturduğu, hedeflerini ve ürünleri konuşmaktı.

Taşıma Dünyası

Nas, Atılım, Container ve Sürücü Teknikleri
<table>
<thead>
<tr>
<th></th>
<th>Karat M</th>
<th>Karat L</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Length</strong></td>
<td>10,7 mt</td>
<td>12 mt</td>
</tr>
<tr>
<td><strong>Passenger Cap.</strong></td>
<td>88</td>
<td>110</td>
</tr>
<tr>
<td><strong>Weight</strong></td>
<td>9,5 ton</td>
<td>10,5 ton</td>
</tr>
<tr>
<td><strong>Engine</strong></td>
<td>6 Cyl, Man – FPT - Cummins</td>
<td></td>
</tr>
<tr>
<td><strong>Power</strong></td>
<td>250-260 PS</td>
<td></td>
</tr>
<tr>
<td><strong>Transmission</strong></td>
<td>Allison, 6 fw, Automatic</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Karat M</td>
<td></td>
</tr>
<tr>
<td>---------------</td>
<td>--------------------------</td>
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<td><strong>Length</strong></td>
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<td></td>
</tr>
<tr>
<td><strong>Weight</strong></td>
<td>11 ton</td>
<td></td>
</tr>
<tr>
<td><strong>Engine</strong></td>
<td>6 Cyl, Man Vertical Gas Engine</td>
<td></td>
</tr>
<tr>
<td><strong>Power</strong></td>
<td>280 PS</td>
<td></td>
</tr>
<tr>
<td><strong>Transmission</strong></td>
<td>Allison, 6 fw, Automatic</td>
<td></td>
</tr>
</tbody>
</table>
Bozankaya R&D team established more than 50 R&D engineers, and they’re transforming dreams comes to true.

For detailed information:
http://www.youtube.com/watch?v=dJGJw9kT-Do
Karat E-Bus

- Bozankaya SCL Batteries
- 300 km Range / 1 time charge
- Hill Holder & Retarder Option
- No Transmission & No Power Loss
- Most Environmental and Economic Electric Vehicle!

For detailed information:
http://www.youtube.com/watch?v=fYmfsCBygrU
Karat E-Bus
with
Bozankaya SCL Battery system

vision in action

01.08.2013
Salzgitter / Germany

For detailed information;
http://www.youtube.com/watch?v=fYmfsCBygrU
KARAT / CENTRAVEL

10.7 mt. Diesel Version

Trailer Version

12 mt. Diesel Version

12 mt. CNG Version
Bozankaya has collaboration with MAN Turkey Factory for Bus Mechanical Assembly operations.
spacious interiors ..
Innovative and intelligent Solutions!
We’re using all kind of technologies for design and analyze and testing our all new models in IDIADA(Spain) equivalent to 1 Mio Km!

http://www.youtube.com/watch?v=eH-h82eos4I
Karat has the most interior volume and seats in its class
TCV Karat’s fuel consumption is the best, considering the Istanbul road and traffic conditions ...

- Fuel economy of 20 lt/day with Diesel Karat!
- Gas economy of 63 m³/day with CNG Karat!

<table>
<thead>
<tr>
<th>Vehicle Type</th>
<th>Min. (lt / km)</th>
<th>Maks. (lt / km)</th>
<th>Acc. to 350 km</th>
</tr>
</thead>
<tbody>
<tr>
<td>Diesel</td>
<td>0,38</td>
<td>0,45</td>
<td>145 lt</td>
</tr>
<tr>
<td>Karat – Diesel</td>
<td>0,33</td>
<td>0,38</td>
<td>125 lt</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Vehicle Type</th>
<th>Min. (m³ / km)</th>
<th>Min. (m³ / km)</th>
<th>Acc. to 350 km</th>
</tr>
</thead>
<tbody>
<tr>
<td>CNG</td>
<td>0,56</td>
<td>0,72</td>
<td>224 m³</td>
</tr>
<tr>
<td>Karat - CNG</td>
<td>0,40</td>
<td>0,52</td>
<td>161 m³</td>
</tr>
</tbody>
</table>
Karat / Trailer Bus

the new competitors of articulated busses ....

Removable / Attachable wagon in 1 minute!
Commercial Vehicle Chassis Production
Production Technology
AS/RS Integrated Production System
Fully automated painting system
High Tech, Zero-Defect Part Production
Quality Control

Measurement with 3D Robotic Laser Tracker system. All critical points under control with high accuracy devices, crack controls after welding process.
Logistic Ability

Just in Time Shipment with Intelligent Storage System and own Truck Fleet
Quick Communication with SAP and EDI usage for all logistic steps.

Automated Storage/Retrieval System
New Projects
Bozankaya already started to Low Floor Tramcar Project for Turkey and MENA market.

Turkey needs big quantities tram in the next 10 years!
And we already started to work to take place in this market as BOZANKAYA
Bozankaya Trambus will be new member of our Product Family.
We’ll start to serial production for 10 vehicles (18.5 and 24.7 m length) as soon.

**Delivery Time:** 2014 August (Malatya Municipality)

**Quantity:** 10 vehicles (24.7 mt)
Bozankaya has collaboration For Traction and Electronical Brake System with Vossloh Kiepe in this project.

http://www.youtube.com/watch?v=sShqnp6-GBc
Vanadium Redox Flow Battery (VRF-B)

- A type of rechargeable flow battery
- employs vanadium ions in different oxidation states to store chemical potential energy
- based on ability of vanadium to exist in solution in four different oxidation states
- battery that has just one electroactive element instead of two

Main advantages
- almost unlimited capacity (size of storage tank)
- complete discharge for long periods possible with no ill effects
- recharge by replacing electrolyte (no time-consuming electronic recharge process)

Topics for research & development
- increase of (presently poor) energy-to-volume ratio (> 25Wh/l) of electrolyte
- optimization of battery components for serial production
- optimization of battery performance for mobile applications (energy density, temperature range etc.)

Future Goals
- Energy Density > 50 Wh/kg
- Mobility

This battery will be feasible for commercial type electrical vehicles; when Energy Density > 60 Wh / kg (Mobility)

<table>
<thead>
<tr>
<th>Specific Energy</th>
<th>32 Wh/kg</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cycle Durability</td>
<td>&gt;18,000</td>
</tr>
<tr>
<td>Nominal Cell Voltage</td>
<td>1.00-1.75 V</td>
</tr>
</tbody>
</table>
Bozankaya SCL-Batteriesystem®

The Future ....
Bozankaya GMBH Salzgitter R&D center, developing Single Cell Loading and our own BMS (Battery Management System)
We know that the most critical point is batteries for electrical vehicles and this is Future!

Quantity: 15,9 cell/mt
Weight: 135,1 kg /mt
Operating Voltage: 112 V (100-143 V)
Capacity: 7000 Ah
Permanent Current: 250 A
Instant Current: 550 A