The engine load was calculated based on rolling resistance given soft sand or packed dirt as might be seen in Cameroon as well as the inertial load of accelerating from 0-20mph in 8 seconds.
Basic Utility Vehicle

April 22, 2010

Designed for Cameroon

Common BUV Applications
- School bus for children and orphans
- Farm commodities and delivery vehicle
- Ambulance medical vehicle
- Material carrier to and from construction projects
- Water distribution (drip irrigation) / water purification
- Water pump or generator

Key Features
- Wooden Truss Frame
- Rear and front suspension using recycled car and truck tires
- Transmission design composed of belts and pulleys
- Dumping bed with fold out seats for passengers
- Steering wheel for easy use
- Bench seat gives room for two

Acknowledgements

Agricultural & Biological Engineering Support
- Dr. Bernie Engel, Department Head
- Dr. John Lurkes, Technical Advisor
Organizational Support
- Institute for Affordable Transportation (Will Austin)
- ACREST – African Center for Renewable Energy and Sustainable Technology
Industry Support
- Yanmar
- Von Tobel Lumber
Others
- ABE Shop: Scott Brand & Gary Williams
- Vincent Kilo – Contact in Cameroon
- Purdue University Student Grant Program

www.drivebuv.org
The spaceframe was designed to maintain the tight tolerances in shafts between the engine and transmission and to the driveshaft given the high deflection in the wood frame. In order to minimize the amount of steel needed, the space frame houses the engine and transmission as well as connects the rest of the vehicle together. Clamps hold the front and rear sections of the frame together and supports on the top and bottom keep the spaceframe from moving along the frame.

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The driveshaft was designed to be simple and strong, and is made from two concentric square steel tubes which can slide inside each other and have yokes attached at either end. This is suitable for low speed applications as well as being simple to manufacture. The rear axle was salvaged from a Toyota pickup, similar to what will be available in Cameroon.

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### Bill of Materials

<table>
<thead>
<tr>
<th>Part</th>
<th># of Units</th>
<th>Supplier</th>
<th>Unit Cost</th>
<th>Line Cost</th>
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</thead>
<tbody>
<tr>
<td>10 hp Yanmar diesel engine</td>
<td>1</td>
<td>Purdue - AIM Dept.</td>
<td>$300.00</td>
<td>$300.00</td>
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<tr>
<td>Toyota axle Assembly</td>
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<td>Pick-A-Part</td>
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<tr>
<td>Drive Shaft</td>
<td>2</td>
<td>Pick-A-Part</td>
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<td>$40.00</td>
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<tr>
<td>Toyota Wheels</td>
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<td>Pick-A-Part</td>
<td>$59.99</td>
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<td>Transmission</td>
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<td>SurplusCenter.com</td>
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<tr>
<td>1/4&quot; Plate Steel</td>
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<td>$14.25</td>
</tr>
<tr>
<td>1 1/8 12ft Square Tubing</td>
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<td>$32.25</td>
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<tr>
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<td>5/8&quot; - Spring Washer</td>
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<td>BoltDepot.com</td>
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Total Cost: $886.97