By definition a lorry loader is a combination of a load carrying vehicle (lorry) and a loader crane, which is intended to facilitate the handling of goods, on and off the vehicle. The object of this document is to clarify the loader crane aspect of a lorry loader for life expectancy.

Loader cranes do not last forever. Life expectancy should be considered when purchasing either new or second hand equipment. Are the loader crane’s remaining fully rated load cycles adequate for the duration of a lease hire contract? How many remaining year’s service has a second hand loader crane? Loader cranes are designed around the fatigue life of the materials used in its manufacture. The fatigue life of a loader crane can be expressed in load cycles. Loader cranes are designed into categories dependent on their mode of operation.

<table>
<thead>
<tr>
<th>Loading Group</th>
<th>Typical operation</th>
<th>Average load cycles</th>
<th>Full rated load cycles</th>
</tr>
</thead>
<tbody>
<tr>
<td>B2</td>
<td>Hook Duty</td>
<td>60,000</td>
<td>20,000</td>
</tr>
<tr>
<td>B3</td>
<td>Grab or Bucket</td>
<td>200,000</td>
<td>60,000</td>
</tr>
<tr>
<td>B4</td>
<td>Timber or Scrap</td>
<td>600,000</td>
<td>200,000</td>
</tr>
</tbody>
</table>

**Example; Brick and Block application**

Crane: 10 Tonne/metre crane  
Crane class: B3, 60,000 full load cycles  
Chassis: 26 Tonne GVM (GVW)  
Chassis: 7250kg kerb weight  
Body: 1000kg  
Subframe: 300kg  
Grab and Rotator: 300kg  
Age of Loader: 5 Years  
Weight of Brick Pack: 1100kg  
Working days per Year: 260 days

Assuming that the vehicle is loaded with a fork truck, and that two full trips are made every working day. *(Be aware that if a lorry loader self loads, as well as off loads, then the number of load cycles will be double that shown in the example below).*

Each load is considered a Full Rated load.

**Step One**  
Add all the component weights of the vehicle and subtract from the GVW to obtain the vehicles Payload.

<table>
<thead>
<tr>
<th>Weight</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Chassis kerb (inc. fuel)</td>
<td>7250kg</td>
</tr>
<tr>
<td>Crane</td>
<td>1500kg</td>
</tr>
<tr>
<td>Body</td>
<td>1000kg</td>
</tr>
<tr>
<td>Subframe</td>
<td>300kg</td>
</tr>
<tr>
<td>Grab + Rotator</td>
<td>300kg</td>
</tr>
<tr>
<td>Total</td>
<td>10350kg</td>
</tr>
<tr>
<td>Gross Vehicle Weight</td>
<td>26000kg</td>
</tr>
<tr>
<td>Payload</td>
<td>15650kg</td>
</tr>
</tbody>
</table>
Step Two

To calculate the maximum number of packs of bricks the vehicle can carry. Divide the Payload figure by the weight of a single pack of bricks.

\[
\frac{15650}{1100} = 14 \text{ Packs}
\]

Step Three

To calculate the number of packs carried in one day. Multiply the maximum number of packs that can be carried by the maximum Number of trips made per day.

\[14 \times 2 = 28 \text{ Packs per day}\]

Step Four

To calculate how many fully rated load cycles that the crane would have expended during its life. Multiply the number of packs carried per day, by the number of working days in a year, and the age of the loader crane in years.

\[28 \text{ Packs a day} \times 260 \text{ days a year} \times 5 \text{ years} = 36,400 \text{ completed cycles}\]

Step Five

Calculate the remaining load cycles by subtracting completed load cycles from total number of fully rated load cycles as specified in the loader cranes loading group, ie. B3

\[60,000 - 36400 = 23600 \text{ cycles}\]

Step Six

To calculate the maximum life remaining in the loader crane. Divide the number of fully rated load cycles remaining by the number of packs carried per year.

\[
\frac{23600}{28 \times 260} = 3.2 \text{ years life remaining.}
\]

The remaining life expectancy given in the example above is the maximum to be expected. The remaining life of a loader crane is also dependent on the quality of its service history and maintenance.

**HINT** loaders cranes equipped for bucket or grab operation will almost certainly have performed a much greater number of load cycles than a loader crane equipped with only a hook.

Should you have any concern regarding the life expectancy of a loader crane, seek the advice of a competent engineer, the manufacturer, manufacturers official representative or an ALLMI member.

Reference information.

- **BS EN 12999** Cranes – Loader Cranes
- **LOLER** Lifting Operations and Lifting Equipment Regulations
- **PUWER** The Provision and Use of Work Equipment Regulations
- **ALLMI** Code of Practice for Installation Application and Operation
- **BS 7121** Safe use of cranes, Parts 2 and 4.

Disclaimer

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