The operational load carriage context of the Australian army soldier
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The Operational Load Carriage Context of the Australian Army Soldier

A/Prof Rob Orr, (Bond University)
DR Rodney Pope, Ass/Professor Julia Coyle (Charles Sturt University)
DR Venerina Johnston (University of QLD)
Soldier Load Carriage: A Risk Management Approach

BLUF

- ARA soldier loads and the context in which they are carried can vary across corps and tasks
- Load carriage is more than just load weight
Original Framework

1. Establish the Context
   - The internal context
   - The external context
   - The risk management context
   - Develop criteria & define the structure

2. Identify Risks
   - What can happen?
   - When and where? How and why?

3. Analyse Risks
   - Identify existing controls
   - Determine consequence & likelihood
   - Determine level of risk

4. Risk Evaluation
   - Compare against criteria
   - Set priorities

5. Treat Risks
   - Identify and assess options
   - Prepare and implement treatment plans
   - Analyse and evaluate residual risk

Framework modified for this research program

1. Establish the Context
   - Scientific context (Literature Review)
   - Historical context (Historical Review)
   - Australian Army context (Study A)

2. Identify Risks
   - Define Risk
   - Risks associated with load carriage (Study B)
   - The Role of physical training (Study C)
   - Policy and Doctrine (Study D)

3. Analyse Risk & 4. Risk Evaluation
   - Analysis and Evaluation of risks associated with soldier load carriage

5. Treat Risk
   - Risk treatments and recommendations
Methods

• ARA soldiers and units selected via purposive sampling

• Online survey had soldiers self-report typical load carriage task on operations within the last 10 years

• Data was triangulated against other sources of data
The Australian Soldier Context

Operational Load Carriage – Last Decade: Load weights

COMBINED LOADS (PO & MO): $M = 47.7$ KG OR 56% BW
Patrol Order = $M=28.4$ kg
Marching Order = $M=56.7$ kg
Survey responses

2002-2003
45.6 kg (SD=22.3 kg)

2009
Engineers
68.6 kg to 86.4 kg
(M=77.7 kg, SD=9.0 kg).

2010
Infantry
59.4 kg to 82.9 kg
(M=65.7 kg, SD=26.2 kg).

PTI – of 26 Members
=47.2 kg (SD 13.1 kg) –
measured on fishing scales

Operation CITADEL = Loads in excess of 45 kg during this operation (Paulson, 2006)

Ops in Afghanistan (Engineer corps), a fellow member carried a Marching Order load of approximately 75 kg (McMahon 2010).

Infantry Soldier → Ops in Afghanistan, carried a Marching Order load ranging from 55 to 70 kg – measured on fishing scales.
The Australian Soldier Context

Operational Load Carriage (Marching Order x Corps)

Mean Marching Order Loads (M&F)

<table>
<thead>
<tr>
<th>Corps*</th>
<th>Mean Load (kg)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Armoured Corps*</td>
<td>61.2</td>
</tr>
<tr>
<td>Infantry Corps*</td>
<td>60.9</td>
</tr>
<tr>
<td>Engineering Corps*</td>
<td>59.4</td>
</tr>
<tr>
<td>Artillery Corps*</td>
<td>58.1</td>
</tr>
<tr>
<td>Signals Corps</td>
<td>54.4</td>
</tr>
<tr>
<td>Other Corps</td>
<td>42.4</td>
</tr>
</tbody>
</table>
The Australian Soldier Context

Operational Load Carriage (Marching Order x Corps)

Mean Marching Order Loads (M only)

- Armoured Corps*: 61.2 kg
- Infantry Corps*: 60.9 kg
- Engineering Corps*: 59.4 kg
- Artillery Corps*: 58.1 kg
- Signals Corps: 57.5 kg
- Other Corps: 48.8 kg

Operational Load Carriage Context of the Australian Army soldier
ABSOLUTE LOADS
FEMALE: $M = 26.4$ kg
MALE: $M = 39.0$ kg

$\text{RELATIVE LOADS}$
FEMALE: $M = 43\%$
MALE: $M = 47\%$

$p = .045$

$p = .55$
**The Australian Soldier Context**

**Operational Load Carriage (Gender or Weight ?)**

<table>
<thead>
<tr>
<th></th>
<th><strong>ABSOLUTE LOADS</strong></th>
<th></th>
<th><strong>RELATIVE LOADS</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Light 20%</td>
<td>( M = 34.7 ) kg</td>
<td>Light 20%</td>
<td>( M = 49% )</td>
</tr>
<tr>
<td>Heavy 20%</td>
<td>( M = 35.7 ) kg</td>
<td>Heavy 20%</td>
<td>( M = 36% )</td>
</tr>
<tr>
<td>( p = .902 )</td>
<td></td>
<td>( p = .0509 )</td>
<td></td>
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</tbody>
</table>
The Australian Soldier Context

Operational Load Carriage

- Approximate relative load carried by Australian Soldiers = 56%, US Army Afghanistan = 55%, Roman Legionnaires = 56%.
### Key Tasks

<table>
<thead>
<tr>
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<th>Mounted patrols</th>
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<tr>
<td></td>
<td>% of total reported corps time allocated to specific tasks</td>
<td>Mean Load: kg (SD)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Artillery</td>
<td>24%</td>
<td>12%</td>
<td>64%</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>47.80 (4.7)</td>
<td>65.40 (7.2)</td>
<td>51.20 (25.5)</td>
<td>-</td>
</tr>
<tr>
<td>Armoured</td>
<td>-</td>
<td>-</td>
<td>16%</td>
<td>84%</td>
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<tr>
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<td>-</td>
<td>-</td>
<td>41.40 (33.8)</td>
<td>36.00 (17.9)</td>
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<tr>
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<td>1%</td>
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<td></td>
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## The Australian Soldier Context

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## The Australian Soldier Context

### Terrain - Type

<table>
<thead>
<tr>
<th>Period</th>
<th>Road</th>
<th>Dirt/Grass</th>
<th>Light bush</th>
<th>Heavy bush</th>
<th>Loose sand</th>
<th>Rock</th>
<th>Other</th>
</tr>
</thead>
<tbody>
<tr>
<td>RECENT OPS</td>
<td>31%</td>
<td>13%</td>
<td>12%</td>
<td>15%</td>
<td>8%</td>
<td>12%</td>
<td>8%</td>
</tr>
</tbody>
</table>

The Operational Load Carriage Context of the Australian Army soldier
## The Australian Soldier Context

### Terrain - Grade

<table>
<thead>
<tr>
<th>Activity</th>
<th>Flat</th>
<th>Mild hills</th>
<th>Steep hills</th>
</tr>
</thead>
<tbody>
<tr>
<td>RECENT OPS</td>
<td>45%</td>
<td>27%</td>
<td>29%</td>
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The Operational Load Carriage Context of the Australian Army soldier
Take Home

• Load carriage is more than just load weight

• Research must consider load but also the context (eg Corps, tasks, terrain)
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