Estimating numbers of Cl. 7 packages shipped

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Introduction

• 20m shipments / year is widely used
• Little understanding of its basis
• Shortage of good data
• Cooperation with WNTI
Does it matter?

• Having an authoritative global figure:
  • Useful in communications / outreach
• Process of collecting data can reveal useful national / regional / global trends for Cl. 7 transport:
  • Allows governments / industry to set strategy accordingly
Information sources

- IAEA paper to 1986 PATRAM
- IAEA Information Sheet
- EC studies
- TRANSAS missions
- MS reports to TRANSSC
- …
Previous research 1 (IAEA)

Title: ESTIMATED ANNUAL WORLDWIDE SHIPMENTS OF RADIOACTIVE MATERIAL
Year: 1986 PATRAM conference

- **Data collection procedure**: Questionnaire, asking international (only export shipment data) and domestic number of “Package Shipment”, centred on 1981.
- **Collected data**: 49 countries responded, 35 counties’ data were used.
- **Conclusion**: from 18 to 38 million Package Shipments were made annually.
- **Notes**:
  - The definition of “Package Shipment” means a single package transported by single mode of transport from an origin to a destination.
    - e.g. 3 Package Shipment
  - The worldwide volume was estimated from the point of view of GDP and population.

Next slide
Approx. 10,000,000 package shipments were reported by 35 countries.

55% of world’s GDP are covered.

26% of world’s population are covered.

Estimated 18,000,000 package shipments worldwide.

Estimated 38,000,000 package shipments worldwide.
Title: STATISTICS ON THE TRANSPORT OF RADIOACTIVE MATERIALS AND STATISTICAL ANALYSIS
Year: 2003

- **Data collection Procedure:** Questionnaire, asking numbers of shipments/packages, centred on 2001.
- **Collected data:** 25 counties’ data have been used.
- **Conclusion:** Over a million packages of radioactive materials are transported
- **Notes:**
  - Paper focussed on occupational and public health impact of Cl. 7 transport
  - Transboundary shipments raises issue of double (or more) counting.
Previous research 2 (EC)
Use of Radioactive Materials

Transport of radioactive material by the nuclear industry often receives public attention but it should be recognised that radioactive material has a significant and vital role in our modern society. Radioactive material is widely used in industry, research and medicine, and transport is an essential activity to make this possible. Some ten million packages are transported worldwide each year.

Electricity generation

Research
<table>
<thead>
<tr>
<th>Country</th>
<th>Organization</th>
<th>Shipments</th>
<th>Packages</th>
<th>(Fuel cycle related packages)</th>
<th>Reported year</th>
</tr>
</thead>
<tbody>
<tr>
<td>EU</td>
<td>ENCO</td>
<td>1,500,000</td>
<td>3,000,000</td>
<td></td>
<td>2018 (draft report)</td>
</tr>
<tr>
<td>Japan</td>
<td>IAEA</td>
<td></td>
<td>707,000</td>
<td>9,223</td>
<td>2006</td>
</tr>
<tr>
<td>Philippine</td>
<td>DOTC</td>
<td></td>
<td>5,431</td>
<td></td>
<td>2013</td>
</tr>
<tr>
<td>US</td>
<td>NEI</td>
<td></td>
<td>3,000,000</td>
<td></td>
<td>2007</td>
</tr>
<tr>
<td>Canada</td>
<td>CNA</td>
<td></td>
<td>1,000,000</td>
<td></td>
<td>1980s</td>
</tr>
<tr>
<td>Korea</td>
<td>Korea Institute of Nuclear Safety (KINS)</td>
<td></td>
<td>311,076</td>
<td>1,479</td>
<td>2016/2017</td>
</tr>
<tr>
<td>China</td>
<td>CNNC</td>
<td></td>
<td>5,000,000*</td>
<td></td>
<td>2018</td>
</tr>
<tr>
<td>~70% GDP</td>
<td></td>
<td></td>
<td>~8.5m packages</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* China figure: Radiopharmaceutical only
Observations

• Estimates collected on number of packages consigned in the EU, US, Canada, Japan, S. Korea and China
• These countries account for around 70% of global GDP.
• Around **12m packages / year** consigned.

• **However**, figures from Canada, US are old
• Market reports suggest use of nuclear medicine is increasing
• Radioisotope packages dominate numbers (see Belgium, Netherlands)
Conclusion

• 20m shipments / year seems to be an overestimate
• Around 15m packages / Over 10m packages may be more accurate
• Risks in changing figures
• Better data could be collected by:
  • National studies
  • Surveys of radioisotope producers