Using Chemical Safety Levels (CSLs) in Laboratory Planning and Design for Cost Effective and Safety

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Preface

There are many new laboratory used by university students

Lack of safety procedure in laboratory

Lack of common standard operations to regulate Safety in laboratory

Determine programs that’s needed to maintain activities in laboratory effectively and efficiently
Introduction

- CSLs is a method of classifying laboratories based on their potential risk. It classifies laboratories into 4 levels.

  - In level 1, a laboratory has only minimum risk of chemical, physical, and biological hazard.
  - In Level 2, has moderate risks of chemical physical, and biological hazard.
  - In Level 3, has substantial risk of chemical physical, and biological hazard.
  - In level 4 (the highest level) has high chemical, physical, and biological hazards.
Objective

Introduce the use of CSL on laboratory in order to obtain optimal laboratory condition, regarding to both safety and cost.
Methodology

Subject: Health Science laboratory in ABC university

Mix Methodology

• Quantitative Univariate
• Qualitative

Triangulation:

• Literature
• Benchmarking
• Observation and Discussion
RESULT
## Laboratory Requirement Based on CSL Analysis

<table>
<thead>
<tr>
<th>VARIABLE</th>
<th>CSL 1</th>
<th>CSL 2</th>
<th>CSL 3</th>
<th>CSL 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Facility</td>
<td>Any Room, No ventilation</td>
<td>Ventilated lab room</td>
<td>Lab room with local ventilation</td>
<td>Specifically designed lab</td>
</tr>
<tr>
<td>Training</td>
<td>Read the Label</td>
<td>Follow the procedures</td>
<td>Generic training for unexpected events</td>
<td>Practice before working with live material</td>
</tr>
<tr>
<td>Oversight</td>
<td>Generic Self-inspection guidelines</td>
<td>General training and check-in visits</td>
<td>Process training and external audits</td>
<td>Written SOPs and specific oversight practices</td>
</tr>
<tr>
<td>PPE</td>
<td>None</td>
<td>Nitrile gloves, eye protection</td>
<td>Appropriate gloves, eye protection, lab coat</td>
<td>Process specific PPE: chemical splash google, heavy chemical resistance gloves (neoprene/buthyl), Chemical apron</td>
</tr>
<tr>
<td>Response Protocol</td>
<td>No unusual hazmat concern</td>
<td>Occupants respond as to general alarm</td>
<td>Specific occupant responses</td>
<td>Special responder planning</td>
</tr>
<tr>
<td>COST</td>
<td>No Added Cost Needed</td>
<td>Cheap</td>
<td>Moderate</td>
<td>Expensive</td>
</tr>
</tbody>
</table>
• 66.7% laboratory have implemented Safety procedure, but none of them have CSL system
• 22.2% over design comparing existing hazard
• 50% of laboratory workers who understand the concept of CSL
Health Science Laboratory
At the Campus Level, CSL’s can be used to:

- Improve training and emergency planning.
- Improve needed Safety Program.
- Support design standards for new and renovated lab settings.

Preliminary estimate for non-chemistry buildings, 75% CSL 2 labs

Cost for Safety Program

Safety and Cost Balance
Conclusion

• CSL regulates various needs regarding safety in labs such as the facilities that need to be present, training that they need most, oversight, PPE that need to be used, response control that needs to be done, and the cost that need to be achieved.
• CSL very useful in cost effectiveness and efficiency safety program in laboratory
• They need to develop and implement CSL system in laboratory
References


Thank You