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Visual Management in Brazilian Construction Companies: Taxonomy and Guidelines for Implementation

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<table>
<thead>
<tr>
<th>Case Study No</th>
<th>Purpose of VM</th>
<th>VM tools features</th>
<th>Capturing VM practices for Future Use</th>
<th>Suggestions for VM implementation</th>
<th>VM implementation issues</th>
<th>Measuring VM performance?</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>• Transparency&lt;br&gt;• Simplication&lt;br&gt;• Better communications between management and (poorly educated) workforce&lt;br&gt;• Efficiency and discipline on sites&lt;br&gt;• Positive impact on the company’s image&lt;br&gt;• Easier site control&lt;br&gt;• Increase productivity</td>
<td>Direct, simple, low-cost and colorful (attractive)</td>
<td>Informally, keeping VM records</td>
<td>• Awareness about production management and lean construction is essential&lt;br&gt;• Concentrating not only in production</td>
<td>• Training workforce can be time consuming&lt;br&gt;• Trained worker turnover&lt;br&gt;• Some lack of consistency in using the tools&lt;br&gt;• Some visual tools are costly</td>
<td>No</td>
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<td>2</td>
<td>• Giving timely information&lt;br&gt;• Raising consciousness about the construction environment&lt;br&gt;• Demonstrating good practices&lt;br&gt;• Enabling easier to control and more standardized construction sites&lt;br&gt;• Reducing waste</td>
<td>-</td>
<td>Formally capturing and documenting different VM implementations (on CDs, catalogues etc). Share practices over the company intranet.</td>
<td>• A comprehensive training plan&lt;br&gt;• Close supervision of new workers&lt;br&gt;• Regularly updating and sustaining different visual tools</td>
<td>• Training workforce can be time consuming</td>
<td>No</td>
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<td>4</td>
<td>• Simplification; reducing complexity on sites&lt;br&gt;• Bonding management and workforce through visual communication&lt;br&gt;• Giving information about the site to the (poorly educated) workforce&lt;br&gt;• Answering workforce questions; guiding the workforce&lt;br&gt;• Coordination of the workforce&lt;br&gt;• Enabling interaction between the management and the workforce.&lt;br&gt;• Enabling orderly and more standardized construction sites.&lt;br&gt;• Contributing to the positive image of the company.</td>
<td>Simple, concise, direct and low-cost</td>
<td>Formally capturing and documenting different VM implementations (on CDs, catalogues etc)</td>
<td>• Understanding the concept of transparency before application&lt;br&gt;• Top managements' support of VM&lt;br&gt;• Patience and persistence in training&lt;br&gt;• Close supervision of the workforce&lt;br&gt;• Demonstrating the practical benefits of different visual tools to the workforce&lt;br&gt;• Paying close attention to the suggestions of the workforce&lt;br&gt;• Maintaining the key personnel&lt;br&gt;• Standardizing the production system&lt;br&gt;• Experimentation with different tools</td>
<td>• Training workforce can be time consuming&lt;br&gt;• Trained worker turnover</td>
<td>No</td>
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<tr>
<td>5</td>
<td>• Better site organization&lt;br&gt;• Cleanness&lt;br&gt;• Reducing waste&lt;br&gt;• Fewer mistakes&lt;br&gt;• Maintaining discipline on site&lt;br&gt;• Easier, simplified and attractive communication for the workforce&lt;br&gt;• Easier control of the site by the management&lt;br&gt;• Stabilizing worker performance by displaying the information the worker needs.&lt;br&gt;• Creating a better image of the company in clients’ and visitors’ perception</td>
<td>-</td>
<td>Formally capturing and documenting different VM implementations (on CDs, catalogues etc)</td>
<td>• Patience and persistence in training.&lt;br&gt;• Demonstrating practical benefits of different visual tools to the workforce.&lt;br&gt;• Receiving feedback from the workforce&lt;br&gt;• Getting the foreman’s consent</td>
<td>• Training workforce can be time consuming&lt;br&gt;• Resistance to change</td>
<td>No</td>
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| 6             | • A tool for people to see the if the construction site works as intended and the deviations from the expected.  
                 • Worker empowerment  
                 • Answering workforce questions; guiding the workforce  
                 • Creating a better image of the company in clients' and visitors' perception  
                 • Reducing waste | Simple concise, direct, do not need to be low-cost | Formally capturing and documenting different VM implementations (on CDs, catalogues etc.) | • Provide suitable channels for the workforce to suggest new ideas and to express themselves (experimentation)  
                   • Top managements' support of VM  
                   • Importance of communicating the vision of the company  
                   • Training by showing  
                   • Understanding the theory behind VM | • Training workforce can be time consuming  
                   • Resistance to change at initial implementation  
                   • Creating the ownership of the workforce for VM | No |
| 7             | • Facilitating construction tasks for management  
                 • Answering workforce questions; guiding the workforce  
                 • Creating a better image of the company in clients' and visitors' perception | Direct, simple, low-cost and colorful (attractive) durable | Formally capturing and documenting different VM implementations (on CDs, catalogues etc.) | Training by showing (using videos) is important | Training workforce can be time consuming  
                   • Resistance to change at initial implementation  
                   • Workers may be afraid of making mistakes | No |
| 8             | • Giving timely information  
                 • Facilitating construction tasks for workers and site control for management  
                 • Increasing the types of work the workers can do on their own  
                 • Creating a better image of the company in clients' and visitors' perception | Direct, simple, low-cost and colorful (attractive) | Formally capturing and documenting different VM implementations (on CDs, catalogues etc.) | Comprehensive training plan  
                   • Persistence and regularity in training  
                   • Care is needed not to create visual pollution (excess information) | Training workforce can be time consuming  
                   • Defining responsibilities for managing different VM tools / systems | No |