A NIGERIAN CASED-BASED STUDY OF NON-VALUE ADDING ACTIVITIES AND THEIR REDUCTION IN CONCRETE PAVER PRODUCTION

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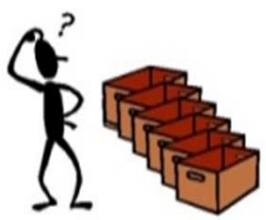
Background – 1

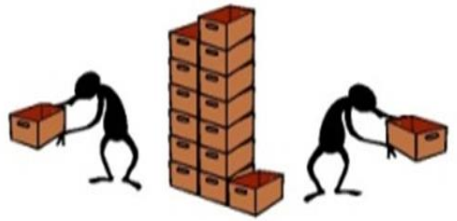
- Waste is responsible for certain production problems in construction
- The negative impact of waste has spurned its reduction related studies

8. Under-utilized Talent



1. Overproduction

2. Waiting



3. Inventory

4. Movement

5. Effort

6. Rework of Errors

7. Processing

Background – 2

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- However, previous studies have not addressed:
- Waste in the production of concrete pavers (CP) in a factory
- The impact of waste in the production process
- Nigerian context

Background – 3

- This paper reports on a case-based study that:
  - ✓Focus on some selected CPs manufacturing factories in Nigeria
  - ✓Investigated the various wastes and their causes in the production process of concrete pavers (PPCPs)
    - ❖ Aim = various NVAAs in PPCPs

Methods –

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- Case-based methods:
  - ✓Interviews (21) in 3 factories
  - ✓Physical observations
  - ✓Survey research (101)
  - ✓Textual data
  - ✓Statistical data

- Central Questions
  - ✓Various waste in each phase of the production of CPs
  - ✓Causes of the waste in each phase
  - ✓Strategy that can be adopted to reduce the waste

Qualitative Results – 1

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Production phase	NVAAs and their descriptions	Waste type
Raw materials procurement phase	Excessive procurement of sand or crusher dust, cement, dyes and curing agent due to unanticipated material requirements	Over production
Batching phase	Long-distance covered from the location where the production materials are temporarily kept to the batching location due to inadequate factory design (layout) and excessive concrete mixture due to negligence or human error	Transportation & over-processing
Material mixing phase	Delay in the new mix due to inaccurate information from the production manager, excessive waiting due to longer mixing time for products that require smoother surfaces and not meeting up with the daily production target or schedule due to several unnecessary waiting while production has already started	Waiting time
Mould filling phase	A sudden crack or damage to containers used to cast CPs due to poor quality, recasting of some CPs due to sudden damage of the containers used to cast the CPs, inadequate or poor compaction of some CPs due to poor supervision and low standard of some CPs due to lack of compliance with the standard specifications	Defect/correction

Table 1: NVAAs in the Production Process of Concrete Pavers

Qualitative Results – 2

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Production phase	NVAAs and their descriptions	Waste type
Drying phase	Over drying of the newly produced CPs due to lack of production control policies and long-distance covered from the production location to the drying environment due to inadequate factory design (factory layout)	Over-processing and transportation
Curing phase	Excessive curing of CPs and poor quality of some CPs due to lack of production control policies; inadequate supervision, and lack of production control policies made worse by poor workmanship	Over-processing and defect/correction
Storing phase	Long-distance covered from the drying/curing position to the storing location due to inadequate factory design and excessive storing of the CPs due to low demands from the clients	Transportation and inventory
Transportation phase	Breaking off (cracking) some CPs while loading them into the vehicle due to the poor quality of the CPs.	Defect/correction

Table 1: NVAAs in the Production Process of Concrete Pavers

Qualitative Results – 3

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- Based on the results, the following tools may help engender efficiency in CP production:
  - ✓Just-in-time (JIT)
  - ✓Total quality control (TQC)
  - ✓Kanban
  - ✓Standard work
  - ✓A3 Problem Solving

- For instance, the concept of Kanban, JIT and the pull principle can be used to reduce waste due to excessive materials on site

Quantitative Results – 1

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Factory	Questionnaire	
	Administered	Returned
A	15	10
B	12	11
C	9	9
D	13	13
E	11	10
F	14	11
G	11	9
H	13	7
I	17	12
J	17	9
Total	132	101

Table 2: Questionnaire administration (76.5% response rate)

Quantitative Results – 2

Statement	Mean Item Score	SD	Cronbach's α	Ranking
Not meeting up with the daily production target	4.23	0.811	0.891	1st
Excessive storing of the concrete pavers	4.17	0.799		2nd
Excessive procurement of sand or crusher dust, cement, dyes and curing agent	4.13	0.813		3rd
Excessive waiting time	4.07	0.813		4th
Long-distance covered from the location where the production materials are temporarily kept to the batching location	3.71	0.892		5th
Excessive concrete mixture	3.53	0.915		6th
Inadequate or poor compaction of some concrete pavers	3.31	0.978		7th
Excessive curing of concrete pavers	2.96	1.178		8th
A recasting of concrete pavers	2.72	0.962		9th
The poor quality of some concrete pavers	2.65	0.998		10th

Table 3: NVAAs perceptions in the production of CPs

Quantitative Results – 3

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Statement	Mean Item Score	SD	Cronbach's α	Ranking
Breaking off (cracking) some concrete pavers while loading them into the vehicle.	2.57	1.098	0.891	11th
The poor quality of some concrete pavers	2.51	1.219		12th
Excessive delay in every new mix	2.12	0.981		13th
Long-distance covered from the drying/curing position to the storing location	1.73	1.276		14th
A sudden damage of the containers used to cast concrete pavers	1.71	1.217		15th
Over drying of the newly produced concrete pavers	1.67	1.214		16th
Long-distance covered from the production location to the drying environment	1.55	1.298		17th

lean practices that will be appropriate for tackling missing daily production target, excess inventory, overproduction, waiting time, processing time, and transportation (or logistics) is required to reduce wastes in the selected CP factories

Table 3: NVAAs perceptions in the production of CPs

Quantitative Results – 3

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Statement	Mean Item Score	SD	Cronbach's α	Ranking
Poor supervision	4.26	0.831	0.821	1st
Deviation from specifications	4.13	0.876		2nd
Longer mixing time for products that require smoother surfaces	4.10	0.751		3rd
Low demands from the customers	3.89	0.967		4th
Negligence or human error	3.71	0.987		5th
Inaccurate information from the production manager	3.65	0.972		6th
Poor quality of some concrete pavers	3.62	0.875		7th
Poor factory design (layout)	3.59	0.981		8th
The poor quality of the containers used to cast concrete pavers	2.53	1.112		9th
Lack of production control policies	2.51	1.198		10th
Sudden (unanticipated) material demand	1.57	1.231		11th

"Lean culture is the component that makes it all happen, the component that musters the organisation's most important resource –its people-to create an organisational 'war on wasteful activities' (Rubrich, 2012: 51)"

Table 4: Causes of NVAAs in the production of CPs

Conclusions

- Waste and their causes exist in the production of CPs in the case factories
- Similar wastes are cited by Yahia (2004), Mossman (2009), Nagapan et al. (2012), and Gatlin (2013)

- The use of specific lean practices and tools will serve the production and profit interest of the case factories
- The practicality of the above suggestions is presently being examined in one of the case factories


thank you
danke
謝謝
ngiyabonga
рахмат
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gracias
bedankt
dziękuję
obrigado
sukriya
kop khun krap
go raibh maith agat
merci
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arigatô
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grazie
tapadh leat
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Баярлалаа
faafetai lava
vinaka
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