

# Informing Collection Development through Citation Examination of the Civil Engineering Research Literature

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# “Standing on the Shoulders of...Librarians”

This research draws upon previous results published, and research methods developed, by other librarians including ELD-ers:

- Linda Musser (1996, 2007)
- Patricia Kirkwood (2009)
- Edward Eckel (2009)

# Research Questions

1. Can differences be detected in citation patterns (such as relative percentages of format type and age of citations) between engineering disciplines?
2. Do civil engineers writing in journals use as high a proportion of grey literature as has been reported for Masters' students theses?
3. Does citation practice show that authors have adopted web resources widely? (Not e-book, e-journal)

# Sample Selection

Six journals were selected using data from *Journal Citation Reports (JCR)*. The journals satisfied two criteria:

1. Ranking in the top 15 journals in civil engineering for impact factor
2. Ranking in the top 15 journals in civil engineering in number of citations in *JCR*

Journal issues were chosen from the May 2008 time period.

# Raw Data Description

- 150 articles from the 6 journals
- 4,172 citations
- Wide variation in number of citations in each article, from 3 (really!) to 62.
- Average of 27.81 citations/article
- As comparison, Musser and Conkling (1996) reported 22.55 citations/article
- More study needed to see if a reason for this difference can be identified

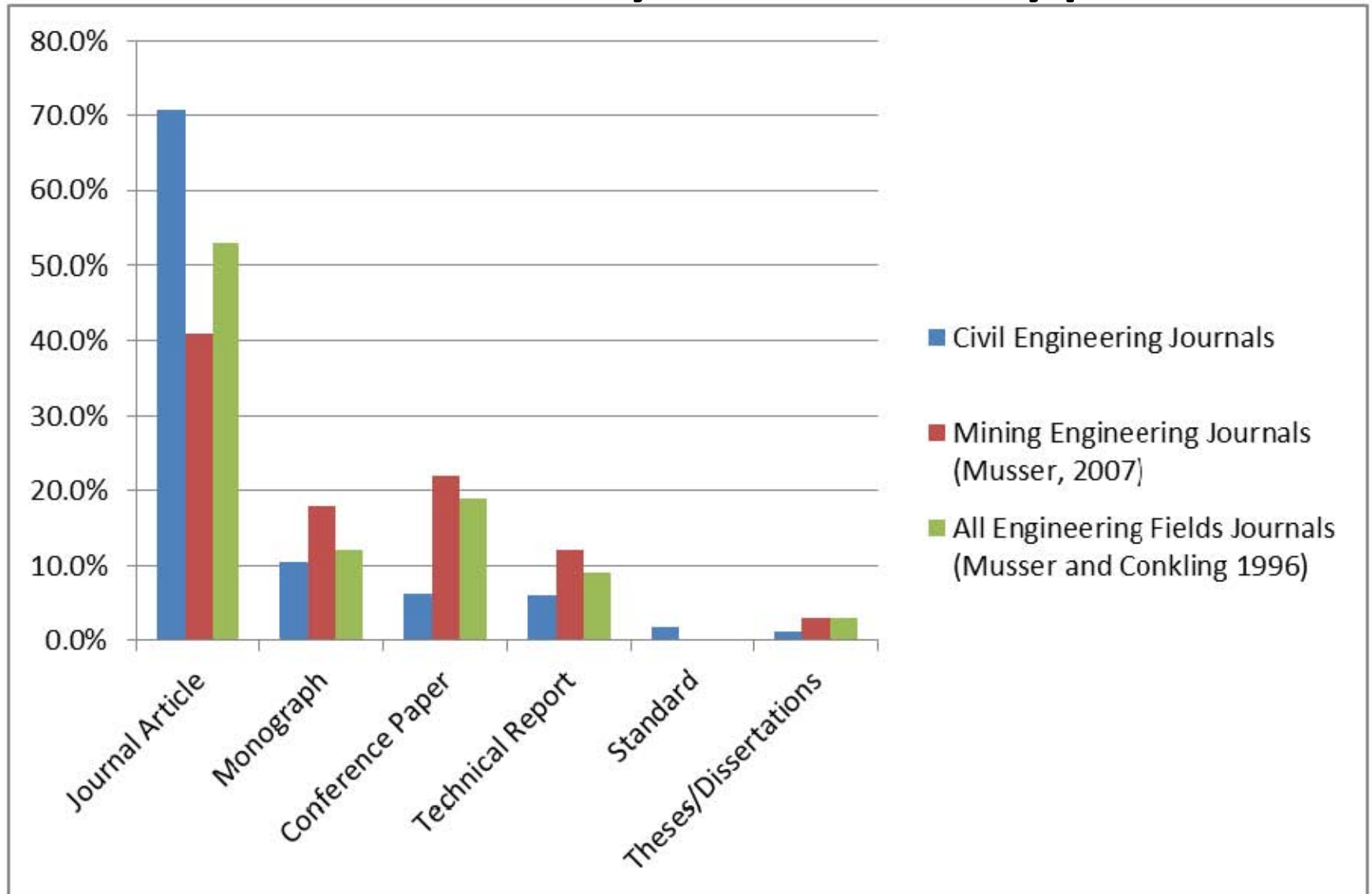
# Analysis

Citations were gathered from each research article in the issue.

Each citation was coded with journal title, article, and number of citation information for later verification purposes.

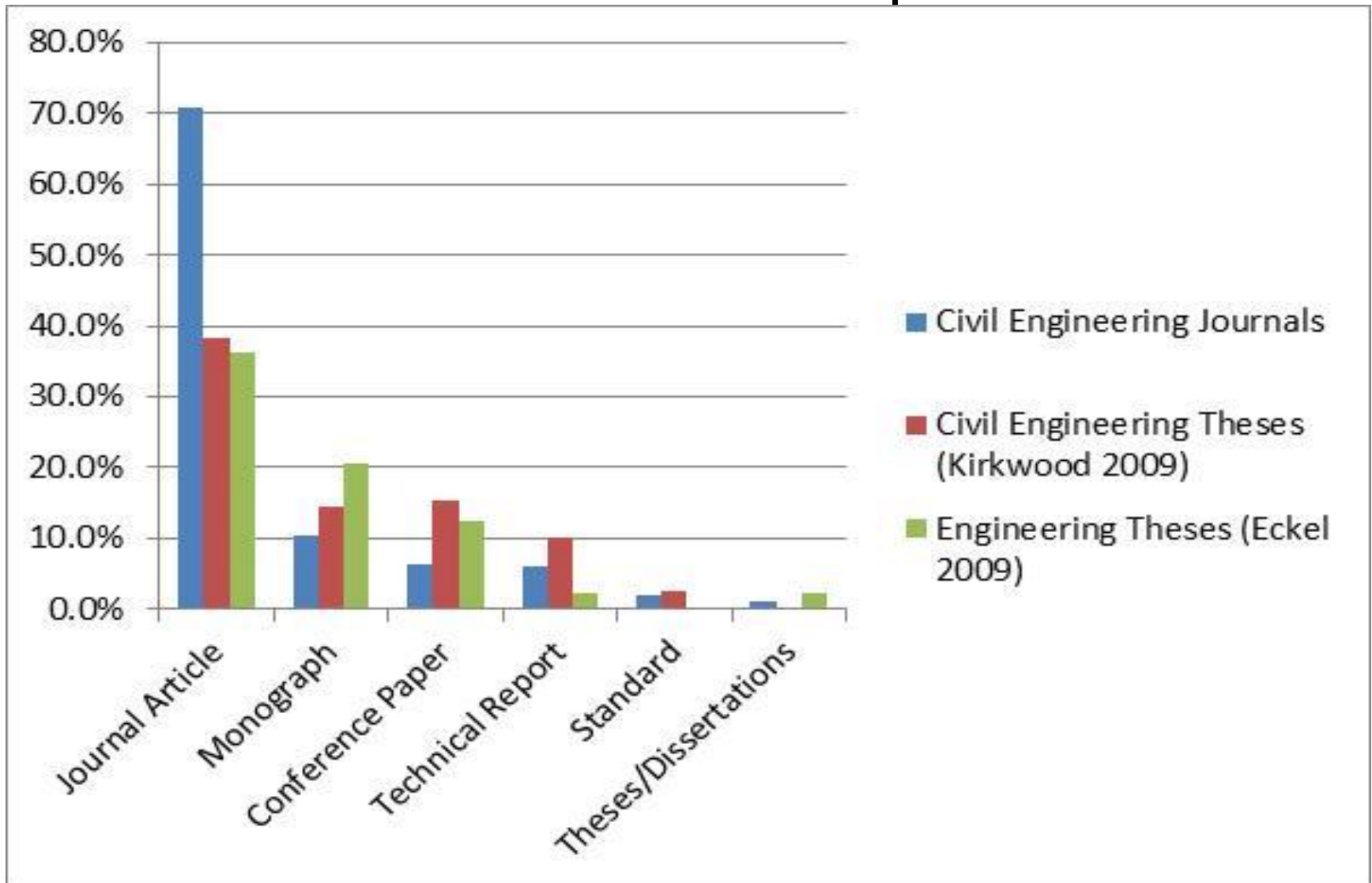
Citations were characterized by format type, age of citation, and whether the citation included a URL address for web retrieval.

# Citations by Format Type



# Citations by Format Type

## Journal-to-Theses Comparison



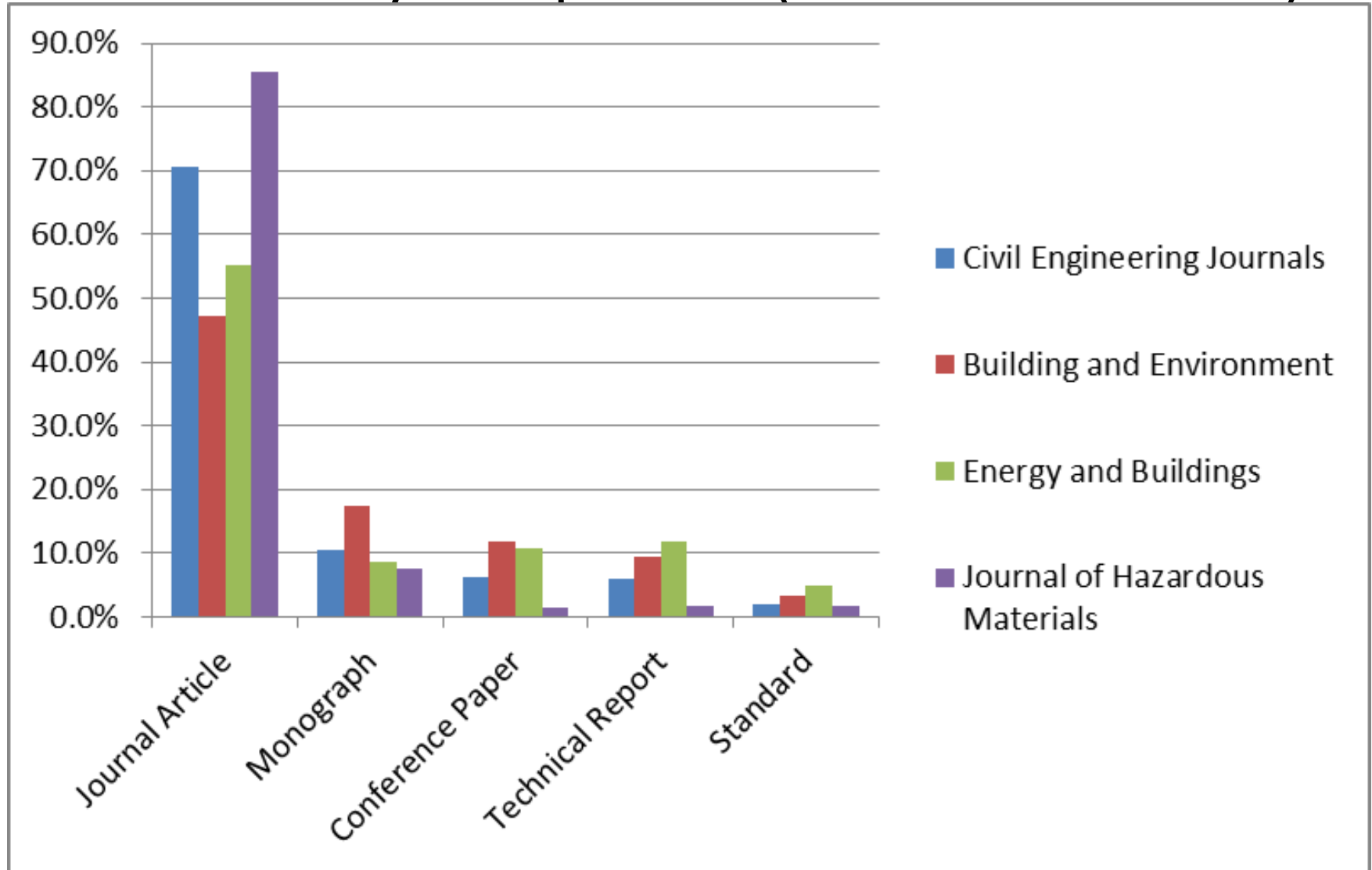


# What about Grey Literature?

- For this study, grey literature included technical reports, standards, theses/dissertations, patents, software/manuals, product literature, unpublished, and unknown/unidentified sources
- Study found 13% of citations in civil engineering journals sampled represented grey literature
- Kirkwood (2009) found 40% of citations in Masters' Theses and PhD Dissertations were grey literature

# Citations by Format Type

Within-study Comparison (Journal-to-Journal)



# Age of Cited Materials

Aging tables show very similar results to those presented for all engineering fields earlier by Musser and Conkling (1996).

<b>Civil Engineering Journals</b>	50% of All Citations	75% of All Citations	90% of All Citations
Journal Articles	7 years	13 years	23 years
Monographs	15 years	25 years	33 years
Conference Paper	8 years	14 years	22 years
Technical Reports	7 years	18 years	29 years
All Formats	7 years	14 years	25 years

# Citation of web resources?

Only 107 citations in the study (2.5%) were cited in the format of a web resource, by URL.

Citation study may be a poor method to measure web resource use.

Citation study of this type cannot determine how book, journal, conference paper, etc. resources may or may not have been accessed through web-based resources.

# Conclusions

- Average number of citations per article observed in this study of civil engineering journals is higher than the average number reported by Musser and Conkling (1996) for engineering journals generally by 5 citations per article, on average.
- Authors of civil engineering journal articles cited different proportions of journals, monographs, and conference proceedings than did authors of mining engineering journal articles reported by Musser (2007).

# Conclusions, cont.

- Journal-to-Journal comparison within the study showed different citation patterns for different sub-fields.
- The age of materials cited by authors in this study shows little difference from results reported by Musser and Conkling (1996).
- This study observed much less use of grey literature by authors of articles in civil engineering journals than did the study of civil engineering graduate student theses and dissertations by Kirkwood (2009).