Task Force 4: Communication of Status of PS&E Publications

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OVERVIEW

The main journals specialized in PS&E are relatively new as most of them started within the past 10-20 years. Some academic institutions and organizations still rank these journals based on outdated metrics or do not account for the significant improvements in the ranks of these journals in various citation databases (e.g. Web of Science, Scopus).

This task force gathered information about the status of the journals in international databases to create awareness on their relative positions with journals in other areas in civil engineering and to observe that they have significatively improved in the last decade. For this purpose, Scopus and Web of Science databases were used to browse the main journals in civil engineering and were ranked based on relevant metrics provided by each database. Besides, the evolution of the rankings by quartiles in the area of civil engineering, a common metric used to classify the journals, was also evaluated. This information was complemented by a list of the main journals in which full professors in our community have published during the last 5 years.

The findings of this task force are summarized in this report which is intended to be used by our community as a mean to communicate the status of PS&E journals to academic institutions and organizations.

1. SCOPUS DATABASE

JOURNAL METRICS

Scopus *Sources* is a comprehensive list of journals from several areas of knowledge maintained by Scopus (https://www.scopus.com/sources.uri). The full database is available and browsable online, and it can also be downloaded as an Excel document, including information on each source. The list is extensive and includes more than 41,000 journals and publication platforms as of November 2021. For each journal, Scopus provides a **CiteScore** among other relevant metrics. This index is calculated annually, and it covers a 4-year publication window. From their webpage:

> *"CiteScore 2020 counts the citations received in 2017-2020 to articles, reviews, conference papers, book chapters and data papers published in 2017-2020, and divides this by the number of publications published in 2017-2020."*

To facilitate the browsing of the journals, it is possible and necessary to narrow down the scope of the search. By selecting the Subject Area *"Civil and Structural Engineering"*, the number of journals is reduced to 401. Of these, 83 do not have a CiteScore assigned, and 10 have score zero. Therefore the list reduces further to **308 journals**. It is considered that many of the potential journals of interest for the researchers in the area of Pavement Engineering may lie within this group.

The journals with CiteScore 0 or N/A were removed from the list. However, these were first inspected to search for exceptional cases. This group of publications comprises mostly local journals, proceedings, or bulletins with no documents or citations reported in the 2017-2020 range, indicating that they were discontinued, or are mostly new or very recent, and therefore hardly established yet. Most of these

journals were as well classified with a low SJR citation index below 0.100 (see next section), or non-existent. There were, however, a few exceptions with SJR greater than 0.300:

- *Journal of Transportation Engineering* (ASCE)
- *Case Studies in Structural Engineering* (Elsevier)
- *DFI Journal* (Taylor & Francis)
- *Road and Transport Research* (ARRB Transport Research Ltd.)

The multiple parts of the *Journal of Transportation Engineering* are considered as separate entities in the list with their own metrics, and that is likely the reason why this entry is isolated from the others. The other three journals are listed here as they may contain pavement-related publications of interest to some authors, but they are not considered in the following sections.

CiteScore index and relationship to SJR index

It is possible to categorize the journals in the *Civil and Structural Engineering* area according to their CiteScore index. Figure 1 presents a summary of the CiteScore categories (from 0 to 18) and the cumulative percentage of journals that fall below each value.

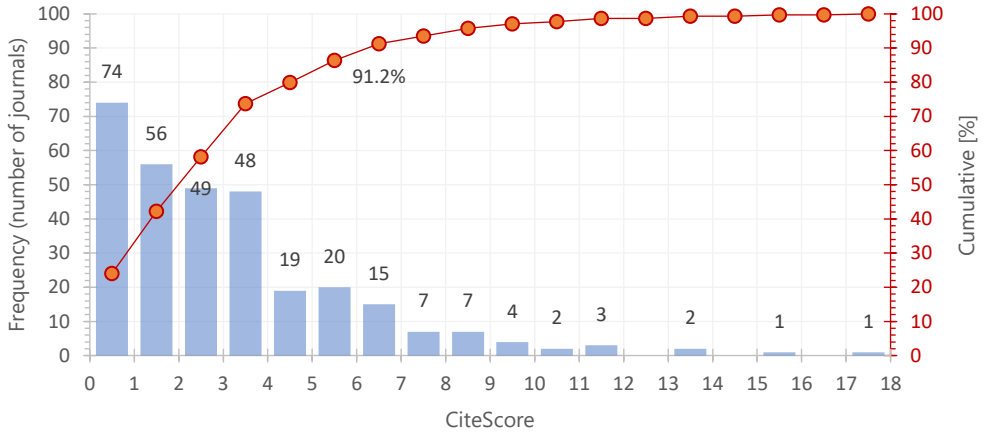

Figure 1. Frequency histogram (bars, left axis) and cumulative percent (line, right axis) of 308 journals in the *"Civil and Structural Engineering"* subject area, according to their Scopus CiteScore (data gathered in 2021).

It can be observed that very few journals make up the upper end of the distribution, with only one journal with CiteScore above 17 (*Computer-Aided Civil and Infrastructure Engineering*, CS=17.1) and three journals with CiteScore between 13 and 16 (*Water Research*, *Transportation Research Part C: Emerging Technologies*, and *Mechanical Systems and Signal Processing*). 50% of the journals have a CiteScore below 2.4, and most of the journals have a CiteScore lower than 12. From the full group, 281 journals have a CiteScore below 7, making up 91.2% of the journals in the area. The remaining 27 journals (8.8%) constitute the top-ranked publications with a CiteScore index above 7. These journals are presented individually in Table 1.

Table 1. Top- ranked journals in the *"Civil and Structural Engineering"* subject area. In Scopus To some point, shaded journals may be of interest to the pavement engineering community (data gathered in 2021).

Rank	Journal title	Publisher	*CiteScore*	*SJR*
1	Computer-Aided Civil and Infrastructure Engineering	Wiley-Blackwell	17.1	2.773
2	Water Research	Elsevier	15.6	3.099
3	Transportation Research Part C: Emerging Technologies	Elsevier	14	3.185
4	Mechanical Systems and Signal Processing	Elsevier	13.2	2.275

5	Automation in Construction	Elsevier	12	1.837
6	Energy	Elsevier	11.5	1.961
7	Transportation Research, Series B: Methodological	Elsevier	11.5	3.15
8	Energy and Buildings	Elsevier	10.9	1.737
9	Sustainable Cities and Society	Elsevier	10.7	1.645
10	Building and Environment	Elsevier	9.7	1.736
11	Composite Structures	Elsevier	9.6	1.63
12	Transportation Research, Part E: Logistics and Transportation Review	Elsevier	9.3	2.042
13	Transportation Research, Part D: Transport and Environment	Elsevier	9.1	1.6
14	Engineering Science and Technology, an International Journal	Elsevier	9	0.803
15	Rock Mechanics and Rock Engineering	Springer Nature	9	2.14
16	Construction and Building Materials	Elsevier	8.8	1.662
17	Transportation Research, Part A: Policy and Practice	Elsevier	8.5	2.178
18	International Journal of Mechanical Sciences	Elsevier	8.3	1.33
19	Structural Safety	Elsevier	8.3	1.644
20	Building Research and Information	Taylor & Francis	8.2	1.249
21	Computers and Structures	Elsevier	8	1.45
22	Geotextiles and Geomembranes	Elsevier	7.8	2.463
23	Journal of Computing in Civil Engineering	ASCE	7.6	0.936
24	Structural Control and Health Monitoring	Wiley-Blackwell	7.6	1.587
25	International Journal of Impact Engineering	Elsevier	7.5	1.534
26	Transportation	Springer Nature	7.5	1.953
27	Steel and Composite Structures	Techno Press	7.4	1.048

As it may be expected, there is relatively noticeable correlation CiteScore index (Scoups) and the SJR (Scimago) ranking, another recognized index for journal classification. To observe the overall correlation between these two indices, Figure 2 shows a plot of CiteScore vs. SJR for the journals of the *Civil and Structural Engineering* subject area.

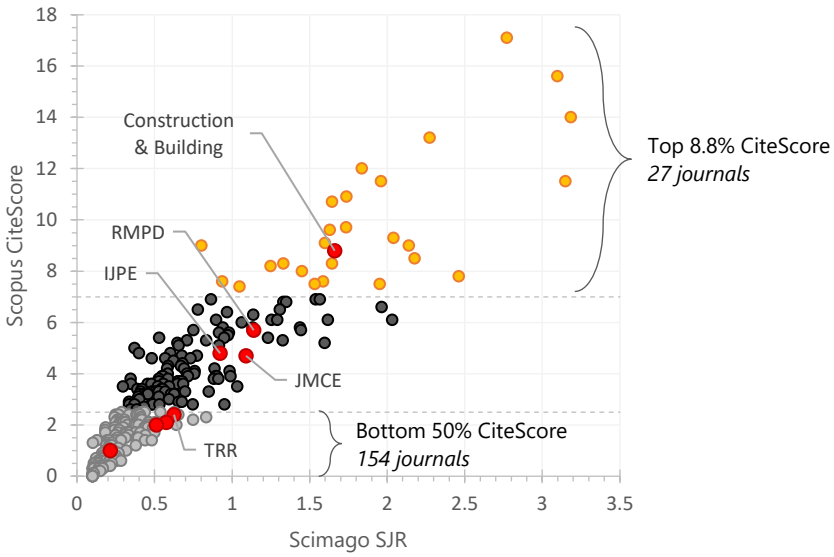

Figure 2. CiteScore vs. SJR for 308 journals in the *"Civil and Structural Engineering"* subject area. The 27 top-ranked journals presented in Table 1 are highlighted (top 8.8%), as well as the lower 50%. Selected journals are marked in red (see section – Zotero database) (data gathered in 2021).

From these figures it may be concluded that, for the most part, the journals directly related to the pavement engineering area will generally have CiteScores lower than ~6, and they will also likely be below SJR ~1.5. It is important to have an overall grasp of these ranges, to gain perspective on the relative position of the journals of interest to pavement engineering among the Civil and Structural Engineering subject area.

It is challenging, among this large group of journals, to identify the publications of most interest to the community based on citation indexes alone. Several variables, many of which may be subjective and difficult to account for, have built a consensus over the years on what are the most appropriate and relevant publications in the area of Pavement Engineering; such trends are also subject to changing in time. Therefore, for this task it would be ideal to conduct a survey among APSE members to establish the list of journals where each researcher has published, including how many times they have done it. This would help create a *definite* list of journals of interest to APSE members, based on previous publications.

An alternative approach to the survey is to review reference databases that are readily available. For example, a Zotero database was recently compiled by Dr. Shane Underwood as part of a previous effort by APSE (Task force 1). This database attempts an initial 'taxonomy' of areas of interest within pavement Engineering, in itself a most valuable effort and an indicator of the general interests of the community. The database was organized to include the following categories: Pavement and asset management, pavement construction, pavement foundations, pavement materials (asphalt binder, asphalt concrete, and Portland Cement concrete), pavement structure, and sustainability. The database contains several references to books, reports, and other types of documents. For the purposes of this analysis, only the journals were analysed. A total of about 230 entries were isolated, containing references to journals or proceedings. Based on the Zotero database, a total of seven journals emerged as the most popular or most cited among the different areas of interest. The journals and their associated metrics (including CiteScore and SJR) are presented in Table 2.

Table 2. Most cited journals in the Zotero Pavement Engineering database (Task Force 1). Selected journals are plotted in Figure 2 (data gathered in 2021 and 2022).

Journal title	Publisher	No. citations in database	*CiteScore*	*SJR*
Transportation Research Record: Journal of the Transportation Research Board	US National Research Council	53	2.4	0.624
Asphalt Paving Technology: Association of Asphalt Paving Technologists – Proceedings of the Technical Sessions		15	1	0.214
International Journal of Pavement Engineering	Taylor & Francis	14	4.8	0.923
Road Materials and Pavement Design	Taylor & Francis	8	5.7	1.14
Construction and Building Materials	Elsevier	7	8.8	1.662
Journal of Materials in Civil Engineering	ASCE	7	4.7	1.09
Journal of Transportation Engineering Part A: Systems	ASCE	7	2.1	0.575
Journal of Transportation Engineering Part B: Pavements	ASCE		2	0.511

There is a noticeable preference in the database for the *Transportation Research Record* journal, followed by the *AAPT*, *IJPE*, *RMPD*, and *C&BM* journals. Interestingly, from this group of journals only the AAPT journal seems to fall below a CiteScore of 2 and SJR 0.5; otherwise the journals are distributed among the middle-low part of the cloud in Figure 2, with the exception of *Construction and Building Materials*.

Although the number of entries in the database may be considered to be slightly limited, it is highly valuable as it provides an overview of the existing consensus of journals of most interest to the community. Interestingly, the journals with the highest relative frequency in this database coincide with the top results presented by Task Force 2 (with the exception, once again, of the AAPT journal); these data were in turn obtained from Web of Science. The coinciding results may strengthen the overall notion that this list is a good indicator of the journals with the highest relative relevancy to the community. A more accurate picture can be obtained, confirmed, and/or expanded after conducting a survey to all the current APSE members.

ADDITIONAL COMMENTS

Considering the diversity in journals in the larger subject area of *Civil and Structural Engineering*, it may be a feasible alternative to some researchers to consider broadening the journals targeted for publication, particularly towards the area of building construction materials. For example, it may be possible or even advisable to aim for some of the top-ranked journals in the area, which, although may not be entirely focused on pavements, may still provide an appropriate fit and a larger audience for papers on pavement engineering. At the same time, some research institutions have agreements with the publishers to facilitate open publication with some selected journals at no cost to the authors. Authors may want to take advantage of such conditions to further disseminate their research.

2. WEB OF SCIENCE DATABASE

JOURNAL METRICS

Web of Science is another comprehensive database list of papers from various journals from several areas of knowledge maintained by Web of Science. The full database is online. For each journal, Web of Science provides a **Journal Impact Factor (JIF)** and a **Journal Citation Indicator (JCI)** among other relevant metrics. From their webpage:

> *"The Journal Impact Factor (JIF) is a journal-level metric calculated from data indexed in the Web of Science Core Collection. It should be used with careful attention to the many factors that influence citation rates, such as the volume of publication and citations characteristics of the subject area and type of journal. The Journal Impact Factor can complement expert opinion and informed peer review. In the case of academic evaluation for tenure, it is inappropriate to use a journal-level metric as a proxy measure for individual researchers, institutions, or articles."*

The *JIF* uses the following formula:

$$2020\ JIF = \frac{Cites\ in\ 2020\ to\ articles\ published\ in\ Journal\ X\ in\ 2018\ and\ 2019}{Total\ number\ of\ articles\ published\ in\ Journal\ X\ in\ 2018\ and\ 2019}$$

> *"The Journal Citation Indicator (JCI) is the average Category Normalized Citation Impact (CNCI) of citable items (articles & reviews) published by a journal over a recent three-year period. The average JCI in a category is 1. Journals with a JCI of 1.5 have 50% more citation impact than the average in that category. It may be used alongside other metrics to help you evaluate journals."*

To facilitate the browsing of the journals, as with the previous database, first the scope of the search was narrowed by selecting the Subject Area *"Civil Engineering"*. *710,069* papers were found published in **200 journals**. Out of these, 78 do not have *JIF* and *JCI* assigned, 4 journals do not have *JIF,* and 7 journals do not have *JCI*. Therefore, the list reduces further to **111 journals.** Many of the potential journals of interest for the researchers in Pavement Engineering lie within this group.

Similar to what was done with Scopus, the journals with no *JIF* and/or *JCI* were removed from the list. However, these were first inspected to search for exceptional cases. This group of publications comprises mostly local journals, proceedings, or bulletins with no documents or citations in the reported range, indicating that they were discontinued, or are mostly new or very recent, and therefore hardly established yet. The 4 journals with no *JIF*, were classified with a *JCI* below 0.7. The 7 journals with no

JCI, were classified with *JIF* between 0.005 and 1.52. The journals with *JIF* greater than 0.5 are listed below:

- *Journal of Transportation Engineering* (ASCE) *JIF*=1.52
- *Journal of Geotechnical Engineering* (ASCE) *JIF*=1.01
- *Journal of Geotechnical Division JIF=0.69*

The multiple parts of the *Journal of Transportation Engineering* are considered as separate entities in the list with their own metrics. The other three journals are listed here as they may contain pavement-related publications of interest to some authors, but they are not considered in the following sections.

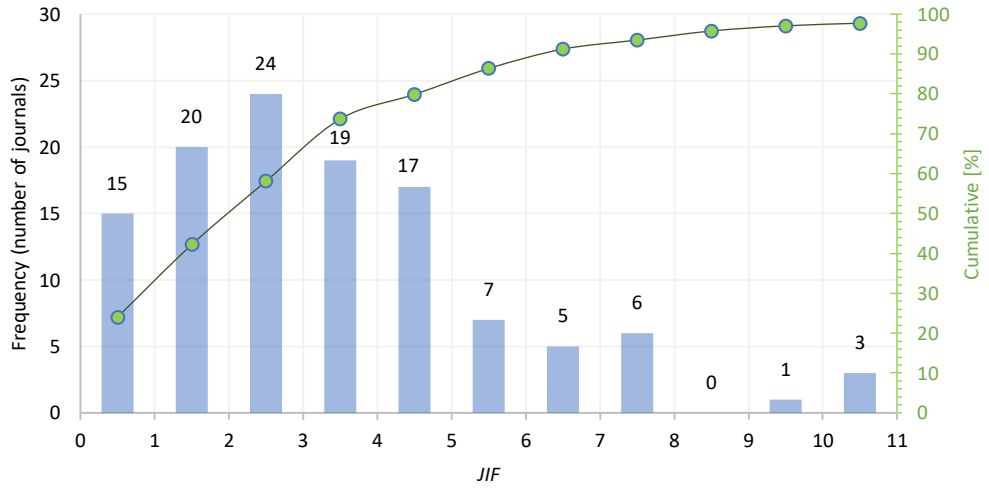

Figure 3. Frequency histogram (bars, left axis) and cumulative percent (line, right axis) of 117 journals in the *"Civil Engineering"* subject area, according to their *JIF* (data gathered in 2022).

It can be observed that, again, very few journals make up the upper end of the distribution, with only three journals with *JIF* above 10 (*Automation in construction JIF=10.5, Computer aided civil and infrastructure engineering JIF=10.1, Transportation research part E: logistics and transportation review JIF=10.5*). 50% of the journals have a *JIF* below 2.5, and most of the journals have a *JIF* lower than 8. From the full group, 91 journals have a *JIF* below 4.5, making up 71.1% of the journals in the area. The remaining 27 journals (22.8%) constitute the top-ranked publications with a *JIF* above 7. These journals are presented individually in Table 3.

Table 3. Top- ranked journals in the *"Civil Engineering"* subject area in Web of Science. Shaded journals may be of interest to the pavement engineering community (data gathered in 2022).

Rank	Journal Title	Publisher	Region	*JIF*	*JCI*
1	Automation in construction	Elsevier	Netherlands	10.52	2.00
2	Computer aided civil and infrastructure engineering	Wiley-Blackwell	USA	10.07	2.24
3	Transportation research part E: logistics and transportation review	Elsevier	USA	10.05	2.24
4	IEEE transactions on intelligent transportation systems	IEEE	USA	9.551	2.19
5	Construction and building materials	Elsevier	England	7.693	1.34
6	Transportation research part B: methodological	Elsevier	USA	7.632	1.69
7	Computers and concrete	Techno-Press	South Corea	7.628	1.56
8	Energy and buildings	Elsevier Science SA	Switzerland	7.201	1.28
9	Journal of building engineering	Elsevier	Netherlands	7.144	1.44
10	Building and environment	Pergamon-Elsevier Science LTD	England	7.093	1.25

Rank	Journal Title	Publisher	Region	*JIF*	*JCI*
11	Journal of hydrology	Elsevier	Netherlands	6.708	1.59

As with the previous database indices, there is a noticeable correlation between the *JIF* and *JCI* indices for journal classification. Figure 4 shows a plot of *JIF* vs. *JCI* for the journals of the *Civil Engineering* subject area.

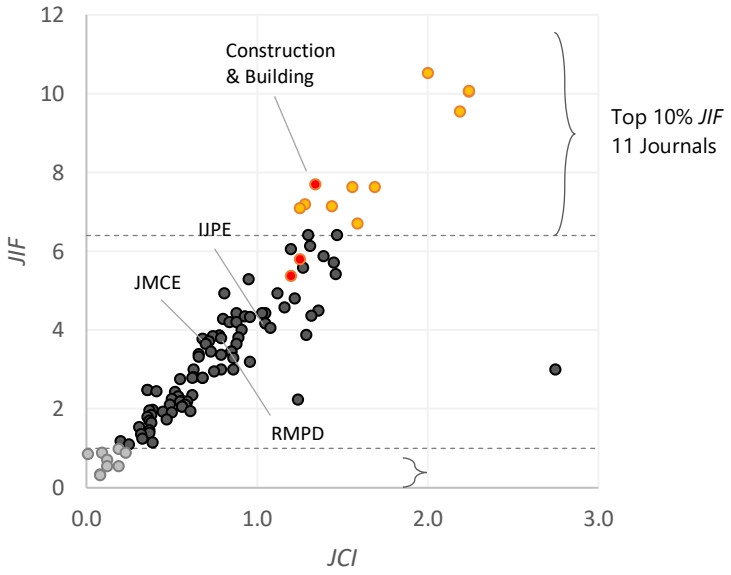

Figure 4 *JIF* vs. *JCI* for 111 journals in the *"Civil Engineering"* subject area. The 27 top-ranked journals presented in Table 2 are marked (top 23%), as well as the lower 50% (data gathered in 2022).

From these figures it may be concluded that, for the most part, the journals directly related to the pavement engineering area will generally have *JIF* between 4 and 8, and they will also likely be below *JIF*~10. It is important to have an overall grasp of these ranges, to gain perspective on the relative position of the journals of interest to pavement engineering among the Civil Engineering subject area.

Based on the Zotero database, a total of seven journals emerged as the most popular or most cited among the different areas of interest. The journals and their associated metrics (including *JIF* and *JCI*) are presented in Table 4. There is a noticeable preference in the database for the *C&BM Journal, followed by the IJPE, RMPD and JMCE*.

Table 4. Most cited journals in the Zotero Pavement Engineering database (Task Force 1). Selected journals are plotted in Figure 4 (data gathered in 2022).

Source title	Publisher	*JIF*	*JCI*
Transportation Research Record	SAGE publications	2.2	0.4
Asphalt Paving Technology: Association of Asphalt Paving Technologists-Proceedings of the Technical Sessions	SAGE publications	-	-
International Journal of Pavement Engineering	Taylor & Francis	4.2	1.1
Road Materials and Pavement Design	Taylor & Francis	3.8	0.8
Construction and Building Materials	Elsevier	7.7	1.3
Journal of Materials in Civil Engineering	ASCE	3.7	0.7
Journal of Transportation Engineering Part A: Systems	ASCE	1.9	0.5
Journal of Transportation Engineering Part B: Pavements	ASCE	2.3	0.5

3. EVOLUTION OF THE RANKING OF JOURNALS IN PAVEMENT ENGINEERING

Databases rank the journals classified under the same area of knowledge by quartiles, depending on their citation metrics (*Q1*: first quartile, *Q2*: second quartile, *Q3*: third quartile, and *Q4*: fourth quartile). The following tables shows the evolution of the rankings in *SJG Scimago Journal and Rank* and in the *Journal of Citation Reports*® (Web of Science) of seven journals where is common to find papers related to pavement engineering. For consistency, the selected area of knowledge was 'Civil and Structural Engineering' or 'Civil Engineering'. Results in these tables show that the relative position of the journals in pavement engineering have significatively improved in the last decade. Currently, 5 out of the 7 papers have reached the highest position in Scopus and 1 in Web of Science. These results also show that, as it is already known, is more difficult to have good metrics in Web of Science than in Scopus.

Table 5. Evolution in the quartile classification of journals related to pavement engineering (SJR Scimago Journal and Country Rank, 'Civil and Structural Engineering' area.

JOURNAL TITLE	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
CONSTRUCTION AND BUILDING MATERIALS	Q1	Q1	Q1	Q1	Q1	Q1	Q1	Q1	Q1	Q1	Q1	Q1
INTERNATIONAL JOURNAL OF PAVEMENT ENGINEERING	Q2	Q2	Q2	Q1	Q2	Q2	Q2	Q1	Q1	Q1	Q1	Q1
ROAD MATERIALS AND PAVEMENT DESIGN	Q3	Q3	Q2	Q2	Q2	Q1	Q1	Q1	Q1	Q1	Q1	Q1
JOURNAL OF MATERIALS IN CIVIL ENGINEERING	Q2	Q2	Q1	Q1	Q1	Q1	Q1	Q1	Q1	Q1	Q1	Q1
TRANSPORTATION RESEARCH RECORD	Q2	Q2	Q2	Q2	Q2	Q2	Q2	Q2	Q2	Q2	Q2	Q2
JOURNAL OF TRANSPORTATION ENGINEERING PART B: PAVEMENTS									Q3	Q2	Q2	Q2
MATERIALS AND STRUCTURES	Q1	Q1	Q1	Q1	Q1	Q1	Q1	Q1	Q1	Q1	Q1	Q1

Table 6. Evolution in the quartile classification of journals related to pavement engineering (Journal of Citation Reports® - Web of Science), 'Civil and Structural Engineering' area.

JOURNAL TITLE	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
CONSTRUCTION AND BUILDING MATERIALS	Q1	Q1	Q1	Q1	Q1	Q1	Q1	Q1	Q1	Q1	Q1	Q1
INTERNATIONAL JOURNAL OF PAVEMENT ENGINEERING		Q3	Q3	Q2	Q3	Q3	Q2	Q1	Q2	Q2	Q1	Q2
ROAD MATERIALS AND PAVEMENT DESIGN	Q4	Q4	Q3	Q2	Q2	Q2	Q2	Q2	Q2	Q2	Q1	Q2
JOURNAL OF MATERIALS IN CIVIL ENGINEERING	Q2	Q2	Q2	Q2	Q2	Q2	Q2	Q2	Q2	Q2	Q2	Q2

TRANSPORTATION RESEARCH RECORD	Q3	Q3	Q3	Q3	Q4	Q4	Q4	Q4	Q4	Q4	Q4	Q3
JOURNAL OF TRANSPORTATION ENGINEERING PART B: PAVEMENTS									Q4	Q4	Q3	Q3
MATERIALS AND STRUCTURES	Q2	Q1	Q2	Q1	Q1	Q1	Q1	Q1	Q2	Q1	Q2	Q2

4. MOST COMMON JOURNALS IN WHICH FULL PROFESSORS IN PAVEMENT ENGINEERING PUBLISH

The information obtained from the previous sections was complemented by searching the journals in which full professors from the PS&E community across Europe, United States, United Kingdom, and Asia publish the most. This search included papers published between 2017 and 2021 from sixteen Professors with over 5,000 citations in Google Scholar, and *h*-index between 22 and 55. A total of 796 papers were found. The results are presented in Figure 5, in the next page.

It is noteworthy that in Figure 5, the category labelled as 'others' includes various journals in which Professors with the criteria described above have also published. Some of these journals are listed in Table 7. These results highlight the multidisciplinary aspects of the PS&E field, and collaboration with other areas/subjects.

Table 7. Journals within the category of 'others' were full Professors from the PS&E community have published between 2017 and 2021

No.	Journal
1	International Journal of Pavement Research and Technology
2	Sustainability (Switzerland)
3	Materials
4	Transportation Research Part D: Transport and Environment
5	International Journal of Transportation Science and Technology
6	Powder Technology
7	NDT and E International
8	Applied Sciences (Switzerland)
9	International Journal of Life Cycle Assessment
10	Journal of Stomatology
11	Energy and Fuels
12	Materials and Design
13	Advances in Materials, Science and Engineering
14	China Journal of Highway and Transport
15	Journal of Infrastructure Systems
16	Journal of Transportation Engineering Part A: Systems
17	Engineering Fracture Mechanics
18	Journal of Transportation Engineering
19	Journal of Computer in Civil Engineering
20	International Journal of Geomechanics
21	Sensors
22	Transportation Research Part C: Emerging Technologies
23	Case Studies in Thermal Engineering

No.	Journal
24	Fuel
25	Composites Part B: Engineering
26	Journal of Hydrology
27	KSCE Journal of Civil Engineering
28	International Journal of Fatigue
29	Structural Control and Health Monitoring
30	Advances in Civil Engineering

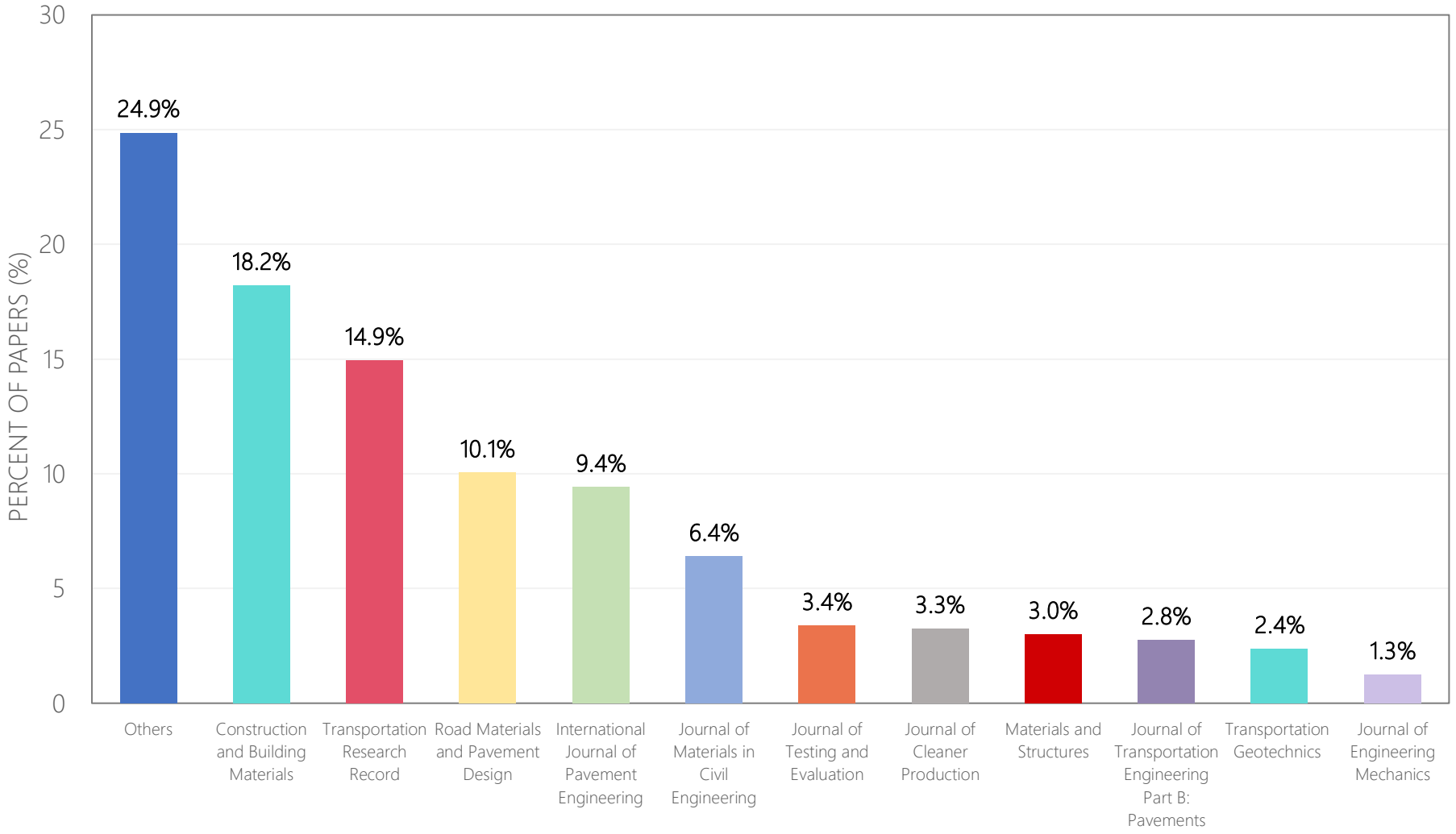

Figure 5 Journals in which full professors with over 5,000 citations in Google Scholar in our community published the most (2017-2021).