

Virginia Polytechnic Institute and State University

# Inventory of Seismic Structural Evaluations, Performance Functions and Taxonomies for Buildings (INSSEPT)



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**Purpose:** The INSSEPT relational database provides published seismic performance-based evaluation of mid-rise buildings, organized based on building taxonomy information. INSSEPT is expected to aid with early design or regional seismic risk assessments. DesignSafe registered users are able to directly extract necessary data using structured query language syntax (MySQL).

**Provenance:** The relational database was created by Mohsen Zaker Esteghamati, Jeonghyun Lee, Matthew Musetich and Madeleine Flint in 2019, as part of the “Resilient and Sustainable Building (RSB)” initiative at Virginia Tech, funded by NSF Award 1455466. Four other undergraduate research assistants (Thea Diep Ton, Natalia Zhukova, Elaine-Joy Consolacion, and Patricia Asiatico) helped with data acquisition. The schema of database and its organizations are discussed in the following paper:

Zaker Esteghamati, M., Lee J., Musetich M., Flint M. M., ‘INSSEPT: An open-source relational database of seismic performance estimation to aid with early design of buildings’ submitted to *Earthquake Spectra*.

The metadata and data present in INSSEPT was originally created by researchers in the earthquake engineering field; full bibliographic references for all original sources are provided in the References.

**Methodology:** INSSEPT was developed using structured query language (SQL) and contains information on published performance-based seismic assessment of mid-rise buildings. Data searches targeted recent literature from credible sources. The information is categorized in 16 tables as discussed in Section 1 of this manual, with table structures organized to prioritize data of interest for structural engineers.

The data was collected during a summer undergraduate research opportunity supported by NSF, and underwent rigorous quality assurance/control procedures. Additionally, the acquired data were vetted to ensure their reliability and accuracy.

**Potential users:** Any party interested in early design of structures (designers, stakeholders, etc.) as well as researchers in natural hazard community interested in portfolio risk assessment

**Possible use cases:**

- Comparing different design alternatives of mid-rise office building in respect to their potential seismic performance
- Regional seismic risk assessment
- Implementation of machine learning algorithms to extract patterns in performance-based assessment

**Technical specifications:** The relational database was developed using MySQL. The hosted web-based version is expected to run without any difficulty in DesignSafe compatible browsers such as Firefox and Chrome. Additionally, an accompanying Jupyter notebook is provided to facilitate data extraction.

This version of INSSEPT is static and is not intended to allow users add information. However, interested users that aim to build upon INSSEPT are welcome to contact the corresponding author.

**Licensing and attribution:** INSSEPT is licensed under CC-BY, 2019. It may be modified for noncommercial use with attribution. The recommended citation for the database is:

Flint, M.M., Zaker Esteghamati M., Lee J., and Musetich M. (2019). *Inventory of Seismic Structural Evaluations, Performance Functions, and Taxonomies for Buildings (INSSEPT)*. DesignSafe-CI PRJ-2469. <https://doi.org/10.17603/ds2-k1g7-vg97>. .

**Acknowledgments:** The authors would like to thank the DesignSafe team for their assistance in hosting the database as well as their technical advice. We specifically acknowledge Mahyar Sharifi Mood, Scott Brandenburg, Ellen Rathje, and Maria Esteva.

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**Disclaimer:** This database is distributed in the hope that it will be useful, but WITHOUT ANY WARRANTY; without even the implied warranty of MERCHANTABILITY or FITNESS FOR A PARTICULAR PURPOSE.

## Contents

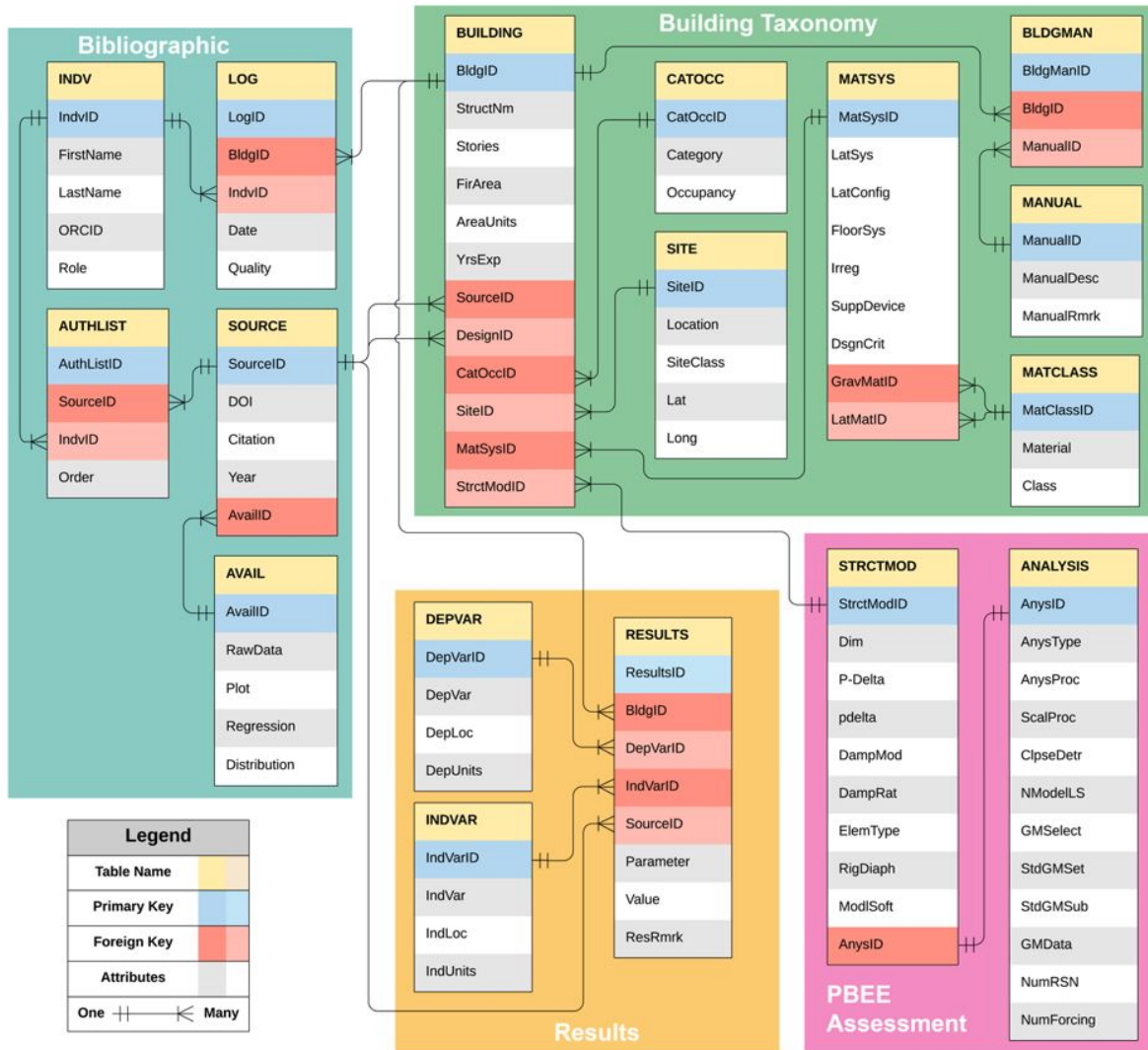
<b>1</b>	<b>Table Description</b>	<b>6</b>
1.1	Building Taxonomy . . . . .	7
1.2	PBEE Assessment . . . . .	10
1.3	Results . . . . .	12
1.4	Bibliographic . . . . .	14
<b>2</b>	<b>Query examples</b>	<b>16</b>
2.1	Query examples for early-design . . . . .	16
2.1.1	Residential occupancy only . . . . .	16
2.1.2	Buildings with steel frame lateral steel frame . . . . .	16
2.1.3	Wood buildings . . . . .	17
2.2	Query examples to extract taxonomy metadata . . . . .	18
2.2.1	Concentrated plasticity element type . . . . .	18
2.2.2	Cloud analysis . . . . .	18
2.2.3	Extracting all result values . . . . .	18
2.2.4	A more refined query to extract results . . . . .	18
2.2.5	Building manuals . . . . .	19
2.3	Query examples to extract source metadata . . . . .	20
2.3.1	Sorting by authors . . . . .	20
2.3.2	Extracting certain authors . . . . .	20
2.3.3	Log information . . . . .	20
2.3.4	Available raw data . . . . .	20
	<b>References</b>	<b>20</b>
	<b>Appendices</b>	<b>25</b>

<b>A</b>	<b>INSSEPT Query Tool</b>	<b>25</b>
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<b>B</b>	<b>INSSEPT LOG</b>	<b>26</b>
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# 1 Table Description

In this section, the complete description of all INSSEPT’s tables are provided and their attributes, data type and example entries are listed. The general organization follows the schema shown in Fig. 1.



**Figure 1:** INSSEPT schema. This figure is replicated from the related manuscript: Zaker Esteghamati, M., Lee J., Musetich M., Flint M. M., “INSSEPT: An open-source relational database of seismic performance estimation to aid with early design of buildings” submitted to Earthquake Spectra.

In the following tables, the pink and purple colors show foreign and primary keys of the tables.

## 1.1 Building Taxonomy

**Table 1:** *Building Table (BUILDING)*

Attribute	Shortened Attr. Name	Data Type	Examples
BuildingID	BldgID	INT	1,2,etc
Structure Name	StructNm	VARCHAR(255)	P2014-NS-S9
Stories	Stories	INT	3,4,7
Floor Area	FlrArea	DECIMAL(10,5)	300,880.28
Area Units	AreaUnits	VARCHAR(255)	m2,ft2
Year of Exposure	YrsExp	INT	0,50
Materials System ID	MatSysID	INT	1,2,3
Structural Model ID	StrctModID	INT	1,2,3
CategoryOccupancyID	CatOccID	INT	1,2,3
Site ID	SiteID	INT	1,2,3
Source ID	SourceID	INT	1,2,3
Design ID	DesignID	TINYINT(1)	1,2,3

**Table 2:** *Category Occupancy Table (CATOCC)*

Attribute	Shortened Attr. Name	Data Type	Examples
Occupancy Category ID	CatOccID	INT	1,2, etc.
Category	Category	VARCHAR(255)	Commercial, Residential
Occupancy	Occupancy	VARCHAR(255)	Office, School

**Table 3:** *Site Table (SITE)*

Attribute	Shortened Attr. Name	Data Type	Examples
Site ID	SiteID	INT	1,2, etc.
Location	Location	VARCHAR(255)	Tehran,Iran; Los Angeles, CA
Site Class	SiteClass	VARCHAR(255)	D,E, II
Latitude	Lat	DECIMAL(10,5)	34.0522
Longitude	Long	DECIMAL(10,5)	118.2437

**Table 4:** *Material System Table (MATSYS)*

Attribute	Shortened Attr. Name	Data Type	Examples
Materials Systems ID	MatSysID	INT	1,2,3, etc.
Lateral System	LatSys	VARCHAR(255)	Ordinary moment resisting, Braced frame
Lateral Configuration	LatConfig	VARCHAR(255)	Perimeter, Space
Floor System	FloorSys	VARCHAR(255)	Flat slab, Waffle Slab
Irregularities	Irreg	VARCHAR(255)	Horizontal, Vertical
Supplemental Devices	SuppDevice	VARCHAR(255)	Fluid Viscous dampers
Design Criteria	DsgnCrit	VARCHAR(255)	Weak-beam-strong-column requirements
Gravity Material ID	GravMatID	INT	1,2,3, etc.
Lateral Material ID	LatMatID	INT	1,2,3, etc.

**Table 5:** *Material Class Table (MATCLASS)*

Attribute	Shortened Attr. Name	Data Type	Examples
Material Class ID	MatClassID	INT	1,2,3, etc.
Material	Material	VARCHAR(255)	concrete, masonry
Class	Class	VARCHAR(255)	Frame, Wall, Dual

**Table 6:** *Building Manual Table (BLDGMAN)*

Attribute	Shortened Attr. Name	Data Type	Examples
Building Manual ID	BldgManID	INT	1,2,etc
Building ID	BldgID	INT	1,2,etc
Manual ID	ManualID	INT	1,2,etc

**Table 7:** *Manual Table (MANUAL)*

Attribute	Shortened Attr. Name	Data Type	Examples
Manual ID	ManualID	INT	1,2, etc.
Manual Description	ManualDesc	VARCHAR(255)	ASCE 7-05, Eurocode 8
Manual Remarks	ManualRmrk	VARCHAR(255)	Designed according to 1975 version of the Turkish seismic design code

## 1.2 Performance-Based Earthquake Engineering Assessment

**Table 8:** *Structural Model Table (STRCTMOD)*

Attribute	Shortened Attr. Name	Data Type	Examples
StructuralModelID	StrctModID	INT	1,2, etc.
Dimension	Dim	VARCHAR(255)	1D, 2D, 3D
P- $\Delta$ effect	PDelta	VARCHAR(255)	Leaning Column
P- $\delta$ effect	pdelta	VARCHAR(255)	Included
Damping Model	DampMod	VARCHAR(255)	Rayleigh damping
Damping Ratio	DampRat	DECIMAL(10,5)	0.05, 0.034, etc.
Element Type	ElemType	VARCHAR(255)	Concentrated plasticity, Distributed plasticity
Rigid Diaphragm	RigDiaph	TINYINT(1)	TRUE, FALSE
Modeling Software	ModlSoft	VARCHAR(255)	OpenSees, DRAIN-2DX, SAP2000
Analysis Procedure ID	AnysID	INT	1,2, etc.

**Table 9:** *Analysis Procedure Table (ANALYSIS)*

Attribute	Shortened Attr. Name	Data Type	Example
AnalysisID	AnysID	INT	1, 2, 3, etc.
Analysis Type	AnysType	VARCHAR(255)	Nonlinear Dynamic, Nonlinear Static
Analysis Procedure	AnysProc	VARCHAR(255)	IDA, Cloud, Multiple Stripe
Scaling Procedure	ScalProc	VARCHAR(255)	Scaled to different Sa levels
Collapse Determination	ClpseDetr	VARCHAR(255)	Drift Limit, Non-Convergence
Non-modeled Limit State	NModelLS	VARCHAR(255)	connection failure, buckling, fatigue
Ground Motion Selection	GMSelect	VARCHAR(255)	Magnitude 6-7, Distance 10-20 km
Standard Ground Motion Set	StdGMSet	VARCHAR(255)	FEMA-P695, LMSR, SAC
Standard Ground Motion Subset	StdGMSub	VARCHAR(255)	Far-Field, Near-field
Ground Motion Database	GMDData	VARCHAR(255)	NGA West 2, PEER, European Strong Motion
Number of Record Station and Event Numbering	NumRSN	INT	22
Number of Forcings	NumForcing	INT	44

### 1.3 Results

**Table 10:** *Result Table (RESULTS)*

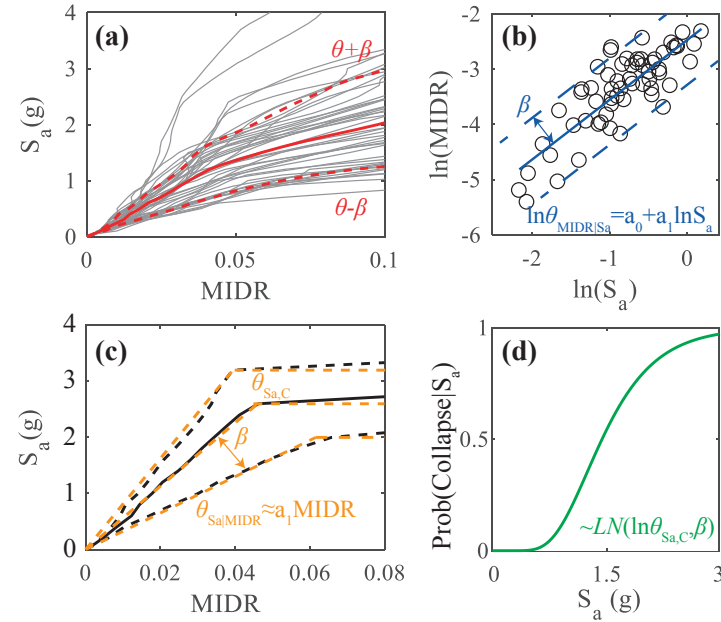
Attribute	Shortened Attr. Name	Data Type	Examples
Results ID	ResultsID	INT	1,2,3, etc.
Building ID	BldgID	INT	1,2,3, etc.
Dependent Variable ID	DepVarID	INT	1,2,3, etc.
Independent Variable ID	IndVarID	INT	1,2,3, etc.
Source ID	SourceID	INT	1,2,3, etc.
Parameter	Parameter	VARCHAR(255)	Slope-linear, Median, Dispersion
Value	Value	DECIMAL(10,5)	0.034, 2.34, 16.977, etc.
Remarks	ResRmrk	VARCHAR(255)	Sa determined based on effective period

**Table 11:** *Independent Variable Table (INDVAR)*

Attribute	Shortened Attr. Name	Data Type	Example
IndVarID	IndVarID	INT	1,2,etc.
Independent Variable Name	IndVar	VARCHAR(255)	Sa(T1), PGA, SD(T1)
Independent Variable Location	IndLoc	VARCHAR(255)	NULL
Independent Variable Units	IndUnits	VARCHAR(255)	g, rad, log(g), m

**Table 12:** *Dependent Variable Table (DEPVAR)*

Attribute	Shortened Attr. Name	Data Type	Examples
DepVarID	DepVarID	INT	1,2,3, etc.
Dependent Variable Name	DepVar	VARCHAR(255)	Maximum Inter-Story Drift (MIDR), Life Safety (LS)
Dependent Variable Location	DepLoc	VARCHAR(255)	Max Stories, Global,
Dependent Variable Units	DepUnits	VARCHAR(255)	%, radians, in/in



**Figure 2:** *Examples of results and stored parameters; figure replicated from accompanying manuscript. (a) Incremental Dynamic Analysis (IDA) empirical quantile curves. (b) Cloud analysis and log-log regression. (c) Simplified IDA representation with reduced data storage. (d) Collapse fragility curve.*

## 1.4 Bibliographic

**Table 13:** *Source Table (SOURCE)*

Attribute	Shortened Attr. Name	Data Type	Examples
SourceID	SourceID	INT	1,2, etc.
DOI	DOI	VARCHAR(255)	10.1016/j.strusafe.2008.06.001
Citation	Citation	VARCHAR(255)	Zareian & Krawinkler, 2007
Year	Year	YEAR(4)	2012
Availability ID	AvailID	INT	1,2,etc.

**Table 14:** *Author List Table (AUTHLIST)*

Attribute	Shortened Attr. Name	Data Type	Examples
AuthorListID	AuthListID	INT	1,2,etc
SourceID	SourceID	INT	1,2,etc
IndividualID	IndvID	INT	1,2,etc
Order	Order	INT	1,2,etc

**Table 15:** *Individual Author/Contributor Table (INDV)*

Attribute	Shortened Attr. Name	Data Type	Examples
Individual ID	IndvID	INT	1,2,3, etc.
First Name	FirstName	VARCHAR(255)	Ershad, Bulent
Last Name	LastName	VARCHAR(255)	Ziaei, Akbas
ORCID ID	ORCID	VARCHAR(255)	0000-0003-3529-6537
Role	Role	VARCHAR(255)	Undergraduate, Graduate

**Table 16:** *Update Log Table (LOG)*

Attribute	Shortened Attr. Name	Data Type	Examples
LogID	LogID	INT	1,2, etc.
BuildingID	BldgID	INT	1,2, etc.
IndividualID	IndvID	INT	1,2, etc.
Date	Date	DATE	2012-03-12
Quality	Quality	VARCHAR(255)	Initial Input, Final Validation, etc.

**Table 17:** *Availability Table (AVAIL)*

Attribute	Shortened Attr. Name	Data Type	Examples
AvailabilityID	AvailID	INT	1,2,etc
RawData	RawData	TINYINT(1)	True,False
Plot	Plot	TINYINT(1)	True,False
Regression	Regression	TINYINT(1)	True,False
Distribution	Distribution	TINYINT(1)	True,False

## 2 Query examples

In this section, twelve query examples are illustrated to demonstrate how to extract information from INSSEPT. While these examples does not cover the full range of information contained in INSSEPT, they lay a foundation for interested readers to construct similar queries with the aid of INSSEPT's schema.

### 2.1 Query examples for early-design

#### 2.1.1 Residential occupancy only

```
SELECT BUILDING.StructNM, BUILDING.Stories, BUILDING.YrsExp,
CATOCC.*, SITE.*
FROM BUILDING
INNER JOIN CATOCC ON BUILDING.CatOccID = CATOCC.CatOccID
INNER JOIN SITE ON BUILDING.SiteID = SITE.SiteID
WHERE CATOCC.Category LIKE "%Residential";
```

	StructNM	Stories	YrsExp	CatOccID	Category	Occupancy	SiteID	Location	SiteClass	Lat	Long
0	J2011-Res-S3	3	0	2	Residential	Residential	3	Tehran, Iran	D	None	None
1	J2011-Res-S7	7	0	2	Residential	Residential	3	Tehran, Iran	D	None	None
2	J2011-Res-S15	15	0	2	Residential	Residential	3	Tehran, Iran	D	None	None
3	V2013-Res-S1	1	0	2	Residential	Residential	10	None	D	None	None
4	V2013-Res-S2	2	0	2	Residential	Residential	10	None	D	None	None
5	V2013-Res-S3	3	0	2	Residential	Residential	10	None	D	None	None
6	V2013-Res-S4	4	0	2	Residential	Residential	10	None	D	None	None
7	V2013-Res-S5	5	0	2	Residential	Residential	10	None	D	None	None
8	V2013-Res-S6	6	0	2	Residential	Residential	10	None	D	None	None
9	V2013-Res-S7	7	0	2	Residential	Residential	10	None	D	None	None
10	V2013-Res-S8	8	0	2	Residential	Residential	10	None	D	None	None
11	V2013-Res-S9	9	0	2	Residential	Residential	10	None	D	None	None
12	V2013-Res-S10	10	0	2	Residential	Residential	10	None	D	None	None

**Figure 3:** *INSSEPT output for extracting residential only buildings*

#### 2.1.2 Buildings with steel frame lateral steel frame

```
SELECT SOURCE.Citation, BUILDING.StructNM,
MATSYS.LatSys, MATSYS.LatConfig, MATSYS.FloorSys,
MATSYS.Irreg, MATSYS.SuppDevice, MATSYS.DsgnCrit,
a.Material as "Gravity Material", a.Class as "Gravity Class",
b.Material as "Lateral Material", b.Class as "Lateral Class"
FROM BUILDING
INNER JOIN SOURCE ON BUILDING.SourceID = SOURCE.SourceID
INNER JOIN MATSYS ON BUILDING.MatSysID = MATSYS.MatSysID
```

```

INNER JOIN MATCLASS a ON MATSYS.GravMatID = a.MatClassID
INNER JOIN MATCLASS b ON MATSYS.LatMatID = a.MatClassID
WHERE b.Material LIKE "%Steel%" AND b.CLASS LIKE "%Frame%"
ORDER BY SOURCE.Citation;

```

	Citation	StructNM	LatSys	LatConfig	FloorSys	Irreg	SuppDevice	DsgnCrit	Gravity Material	Gravity Class	Lateral Material	Lateral Class
0	Akbas et al., 2013	A2013-NS-S9-ductile	Concentrically braced	Perimeter	None	None	None	Ductile	Steel	Frame	Steel	Frame
1	Akbas et al., 2013	A2013-NS-S3-ductile	Concentrically braced	Perimeter	None	None	None	Ductile	Steel	Frame	Steel	Frame
2	Akbas et al., 2013	A2013-NS-S9-nonductile	Concentrically braced	Perimeter	None	None	None	Non-ductile	Steel	Frame	Steel	Frame
3	Akbas et al., 2013	A2013-NS-S3-nonductile	Concentrically braced	Perimeter	None	None	None	Non-ductile	Steel	Frame	Steel	Frame
4	Akbas et al., 2013	A2013-NS-S9-ductile	Concentrically braced	Perimeter	None	None	None	Ductile	Steel	Frame	Concrete, Steel	Frame
5	Akbas et al., 2013	A2013-NS-S3-ductile	Concentrically braced	Perimeter	None	None	None	Ductile	Steel	Frame	Concrete, Steel	Frame

Figure 4: *INSSEPT output for buildings with steel frame lateral system*

### 2.1.3 Wood buildings

```

SELECT
SOURCE.Citation, BUILDING.StructNM,
MATSYS.LatSys, MATSYS.LatConfig, MATSYS.FloorSys,
MATSYS.Irreg, MATSYS.SuppDevice, MATSYS.DsgnCrit,
a.Material as "Gravity Material", a.Class as "Gravity Class"
FROM BUILDING
INNER JOIN SOURCE ON BUILDING.SourceID = SOURCE.SourceID
INNER JOIN MATSYS ON BUILDING.MatSysID = MATSYS.MatSysID
INNER JOIN MATCLASS a ON MATSYS.GravMatID = a.MatClassID
WHERE a.MATERIAL LIKE "%Wood%"
ORDER BY SOURCE.Citation;

```

	Citation	StructNM	LatSys	LatConfig	FloorSys	Irreg	SuppDevice	DsgnCrit	Gravity Material	Gravity Class
0	Li et al., 2010	L2010-Res-W1-engineered	Shear wall	Space	None	None	None	Engineered construction, complying to modern c...	Wood	Wall
1	Li et al., 2010	L2010-Res-W1-engineered	Shear wall	Space	None	None	None	Engineered construction, complying to modern c...	Wood	Wall
2	Li et al., 2010	L2010-Res-W1-conventional	Shear wall	Space	None	None	None	Shear walls are anchored to the foundation, old...	Wood	Wall
3	Li et al., 2010	L2010-Res-W1-conventional	Shear wall	Space	None	None	None	Shear walls are anchored to the foundation, old...	Wood	Wall
4	Li et al., 2010	L2010-Res-W1-conventional	Shear wall	Space	None	None	None	Shear walls are anchored to the foundation, old...	Wood	Wall
5	Li et al., 2010	L2010-Res-W1-conventional	Shear wall	Space	None	None	None	Shear walls are anchored to the foundation, old...	Wood	Wall
6	Li et al., 2010	L2010-Res-W1-engineered	Shear wall	Space	None	None	None	Engineered construction, complying to modern c...	Wood	Wall
7	Li et al., 2010	L2010-Res-W1-engineered	Shear wall	Space	None	None	None	Engineered construction, complying to modern c...	Wood	Wall

Figure 5: *INSSEPT output for wood buildings*

## 2.2 Query examples to extract taxonomy metadata

### 2.2.1 Concentrated plasticity element type

```
SELECT SOURCE.*, BUILDING.StructNM,
BUILDING.Stories, BUILDING.AreaUnits, BUILDING.YrsExp,
STRCTMOD.*
FROM BUILDING
INNER JOIN SOURCE ON BUILDING.SourceID = SOURCE.SourceID
INNER JOIN MATSYS ON BUILDING.MatSysID = MATSYS.MatSysID
INNER JOIN STRCTMOD ON BUILDING.StrctModID =
STRCTMOD.StrctModID
WHERE STRCTMOD.ElemType LIKE "%plastic%";
```

### 2.2.2 Cloud analysis

```
SELECT SOURCE.Citation, BUILDING.StructNM,
ANALYSIS.*
FROM BUILDING
INNER JOIN SOURCE ON BUILDING.SourceID = SOURCE.SourceID
INNER JOIN STRCTMOD ON BUILDING.StrctModID =
STRCTMOD.StrctModID
INNER JOIN ANALYSIS ON STRCTMOD.AnysID = ANALYSIS.AnysID
WHERE ANALYSIS.AnysProc LIKE "Cloud%"
ORDER BY SOURCE.Citation;
```

### 2.2.3 Extracting all result values

```
SELECT a.Citation, BUILDING.StructNm,
DEPVAR.DepVar, INDVAR.IndVar, RESULTS.Parameter,
RESULTS.Value, b.Citation
FROM BUILDING
INNER JOIN SOURCE a ON BUILDING.SourceID = a.SourceID
INNER JOIN RESULTS ON BUILDING.BldgID = RESULTS.BldgID
INNER JOIN DEPVAR ON RESULTS.DepVarID = DEPVAR.DepVarID
INNER JOIN INDVAR ON RESULTS.IndVarID = INDVAR.IndVarID
INNER JOIN SOURCE b ON RESULTS.SourceID = b.SourceID;
```

### 2.2.4 A more refined query to extract results

```
SELECT a.Citation, BUILDING.StructNm
, INDVAR.IndVar, DEPVAR.DepVar, RESULTS.Parameter
, RESULTS.Value, b.Citation as "Conducted by"
FROM BUILDING
INNER JOIN SOURCE a ON BUILDING.SourceID = a.SourceID
INNER JOIN RESULTS ON BUILDING.BldgID = RESULTS.BldgID
INNER JOIN DEPVAR ON RESULTS.DepVarID = DEPVAR.DepVarID
INNER JOIN INDVAR ON RESULTS.IndVarID = INDVAR.IndVarID
INNER JOIN SOURCE b ON RESULTS.SourceID = b.SourceID
ORDER BY BUILDING.StructNm, DEPVAR.DepVar;
```

	Citation	StructNm	DepVar	IndVar	Parameter	Value	Citation
0	Pitilakis et al., 2014	P2014-NS-S3-0	Period	None	None	0.980	Pitilakis et al., 2014
1	Pitilakis et al., 2014	P2014-NS-S3-50	Period	None	None	0.980	Pitilakis et al., 2014
2	Pitilakis et al., 2014	P2014-NS-S9-0	Period	None	None	0.890	Pitilakis et al., 2014
3	Pitilakis et al., 2014	P2014-NS-S9-50	Period	None	None	0.890	Pitilakis et al., 2014
4	Pitilakis et al., 2014	P2014-NS-S4-0	Period	None	None	0.660	Pitilakis et al., 2014
5	Pitilakis et al., 2014	P2014-NS-S4-50	Period	None	None	0.660	Pitilakis et al., 2014
6	Jalali et al., 2011	J2011-Res-S3	Period	None	None	0.480	Jalali et al., 2011
7	Jalali et al., 2011	J2011-Res-S3	Period	None	None	0.760	Jalali et al., 2011
8	Jalali et al., 2011	J2011-Res-S7	Period	None	None	0.940	Jalali et al., 2011
9	Jalali et al., 2011	J2011-Res-S7	Period	None	None	1.410	Jalali et al., 2011
10	Jalali et al., 2011	J2011-Res-S15	Period	None	None	1.750	Jalali et al., 2011
11	Jalali et al., 2011	J2011-Res-S15	Period	None	None	2.680	Jalali et al., 2011
12	Ariyaratana & Fahnstock, 2011	A2011-NS-S7-BRB	Period	None	None	0.940	Ariyaratana & Fahnstock, 2011
13	Ariyaratana & Fahnstock, 2011	A2011-NS-S7-BRBw/moment	Period	None	None	0.930	Ariyaratana & Fahnstock, 2011
14	Ariyaratana & Fahnstock, 2011	A2011-NS-S7-SMRF	Period	None	None	0.900	Ariyaratana & Fahnstock, 2011
15	Ariyaratana & Fahnstock, 2011	A2011-NS-S7-SMRFw/moment	Period	None	None	0.890	Ariyaratana & Fahnstock, 2011

**Figure 6:** *INSSEPT* output for all available results

## 2.2.5 Building manuals

```
SELECT BUILDING.StructNm, MANUAL.ManualDesc
FROM BUILDING
INNER JOIN BLDGMAN ON BUILDING.BldgID = BLDGMAN.BldgID
INNER JOIN MANUAL ON BLDGMAN.ManualID = MANUAL.ManualID
ORDER BY BUILDING.StructNm;
```

	StructNm	ManualDesc
0	A2010-Res-S10	Iranian Seismic Code 2800
1	A2010-Res-S10	Iranian Seismic Code 2800
2	A2010-Res-S5	Iranian Seismic Code 2800
3	A2010-Res-S5	Iranian Seismic Code 2800
4	A2010-Res-S5	Iranian Seismic Code 2800
5	A2011-NS-S7-BRB	SEI/ASCE 7-05
6	A2011-NS-S7-BRB	AISC Seismic Provisions
7	A2011-NS-S7-BRBw/moment	SEI/ASCE 7-05
8	A2011-NS-S7-BRBw/moment	AISC Seismic Provisions
9	A2011-NS-S7-SMRF	SEI/ASCE 7-05
10	A2011-NS-S7-SMRF	AISC Seismic Provisions
11	A2011-NS-S7-SMRFw/moment	SEI/ASCE 7-05
12	A2011-NS-S7-SMRFw/moment	AISC Seismic Provisions
13	A2013-NS-S3-ductile	ASCE-2005

**Figure 7:** *INSSEPT* output for extracting building manuals

## 2.3 Query examples to extract source metadata

### 2.3.1 Sorting by authors

```
SELECT SOURCE.Citation, BUILDING.StructNM,
INDV.FirstName, INDV.LastName
FROM BUILDING
INNER JOIN SOURCE ON BUILDING.SourceID = SOURCE.SourceID
INNER JOIN AUTHLIST ON SOURCE.SourceID = AUTHLIST.SourceID
INNER JOIN INDV ON AUTHLIST.IndvID = INDV.IndvID
ORDER BY INDV.LastName, SOURCE.Citation;
```

### 2.3.2 Extracting certain authors

```
SELECT SOURCE.Citation, BUILDING.StructNM
FROM BUILDING
INNER JOIN SOURCE ON BUILDING.SourceID = SOURCE.SourceID
WHERE SOURCE.Citation LIKE "%Ariyaratana%"
ORDER BY SOURCE.Citation;
```

	Citation	StructNM
0	Ariyaratana & Fahnestock, 2011	A2011-NS-S7-BRB
1	Ariyaratana & Fahnestock, 2011	A2011-NS-S7-BRBw/moment
2	Ariyaratana & Fahnestock, 2011	A2011-NS-S7-SMRF
3	Ariyaratana & Fahnestock, 2011	A2011-NS-S7-SMRFw/moment

Figure 8: *INSSEPT* output to extract entries by a certain author

### 2.3.3 Log information

```
SELECT BUILDING.StructNM, INDV.FirstName,
INDV.LastName, LOG.Date, LOG.Quality
FROM BUILDING
INNER JOIN LOG ON BUILDING.BldgID = LOG.BldgID
INNER JOIN INDV ON LOG.IndvID = INDV.IndvID
ORDER BY Log.Date;
```

### 2.3.4 Available raw data

```
SELECT SOURCE.*, BUILDING.StructNM, BUILDING.Stories,
BUILDING.AreaUnits, BUILDING.YrsExp, SITE.*, AVAIL.*
FROM BUILDING
INNER JOIN SOURCE ON BUILDING.SourceID = SOURCE.SourceID
INNER JOIN CATOCC ON BUILDING.CatOccID = CATOCC.CatOccID
INNER JOIN SITE ON BUILDING.SiteID = SITE.SiteID
INNER JOIN AVAIL ON SOURCE.AvailID = AVAIL.AvailID
WHERE AVAIL.RawData = 1;
```

	StructNM	FirstName	LastName	Date	Quality
0	F2014-NS-S3	Natalia	Zhukova	2019-06-11	Initial input
1	F2014-NS-S5	Natalia	Zhukova	2019-06-11	Initial input
2	F2014-NS-S7	Natalia	Zhukova	2019-06-11	Initial input
3	A2013-NS-S3-nonductile	Natalia	Zhukova	2019-06-12	Initial input
4	A2013-NS-S9-nonductile	Natalia	Zhukova	2019-06-12	Initial input
5	A2013-NS-S3-ductile	Natalia	Zhukova	2019-06-12	Initial input
6	A2013-NS-S9-ductile	Natalia	Zhukova	2019-06-12	Initial input
7	A2011-NS-S7-BRB	Patricia	Asiatico	2019-06-12	Initial input
8	A2011-NS-S7-BRBw/moment	Patricia	Asiatico	2019-06-12	Initial input
9	A2011-NS-S7-SMRF	Patricia	Asiatico	2019-06-12	Initial input
10	A2011-NS-S7-SMRFw/moment	Patricia	Asiatico	2019-06-12	Initial input
11	U2004-NS-S3-BRB	Patricia	Asiatico	2019-06-13	Initial input
12	U2004-NS-S6-BRB	Patricia	Asiatico	2019-06-13	Initial input
13	R2012-NS-RC3-FIXEDBASE	Matthew	Musetich	2019-06-13	Initial input
14	R2012-NS-RC3-SSI	Matthew	Musetich	2019-06-13	Initial input
15	R2012-NS-RC5-FIXEDBASE	Matthew	Musetich	2019-06-13	Initial input
16	R2012-NS-RC5-SSI	Matthew	Musetich	2019-06-13	Initial input
17	R2012-NS-RC9-FIXEDBASE	Matthew	Musetich	2019-06-13	Initial input
18	R2012-NS-RC9-SSI	Matthew	Musetich	2019-06-13	Initial input

Figure 9: *INSSEPT* output for log of changes

SourceID	DOI	Citation	Year	AvailID	StructNM	Stories	AreaUnits	YrsExp	SiteID	Location	SiteClass	Lat	Long	A
0	48	10.1002/eqe.2440	Seo et al., 2014	2014	3	S2014-Com-S4-SMRF	4	m^2	0	22	Stiff soil site	D	None	None
1	48	10.1002/eqe.2440	Seo et al., 2014	2014	3	S2014-Com-S4-MRF-viscousdampers	4	m^2	0	22	Stiff soil site	D	None	None
2	48	10.1002/eqe.2440	Seo et al., 2014	2014	3	S2014-Com-S4-MRF-viscousdampers	4	m^2	0	22	Stiff soil site	D	None	None
3	48	10.1002/eqe.2440	Seo et al., 2014	2014	3	S2014-Com-S4-MRF-viscousdampers	4	m^2	0	22	Stiff soil site	D	None	None
4	48	10.1002/eqe.2440	Seo et al., 2014	2014	3	S2014-Com-S4-MRF-viscousdampers	4	m^2	0	22	Stiff soil site	D	None	None
5	12	10.1016/j.scient.2013.04.003	Hariiri-Ardebili et al., 2013	2013	4	H2013-G4-S15	15	m^2	0	7	None	II	None	None
6	12	10.1016/j.scient.2013.04.003	Hariiri-Ardebili et al., 2013	2013	4	H2013-G4-S13	13	m^2	0	7	None	II	None	None

Figure 10: *INSSEPT* output for entries with available raw data

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# Appendices

## A INSSEPT Query Tool

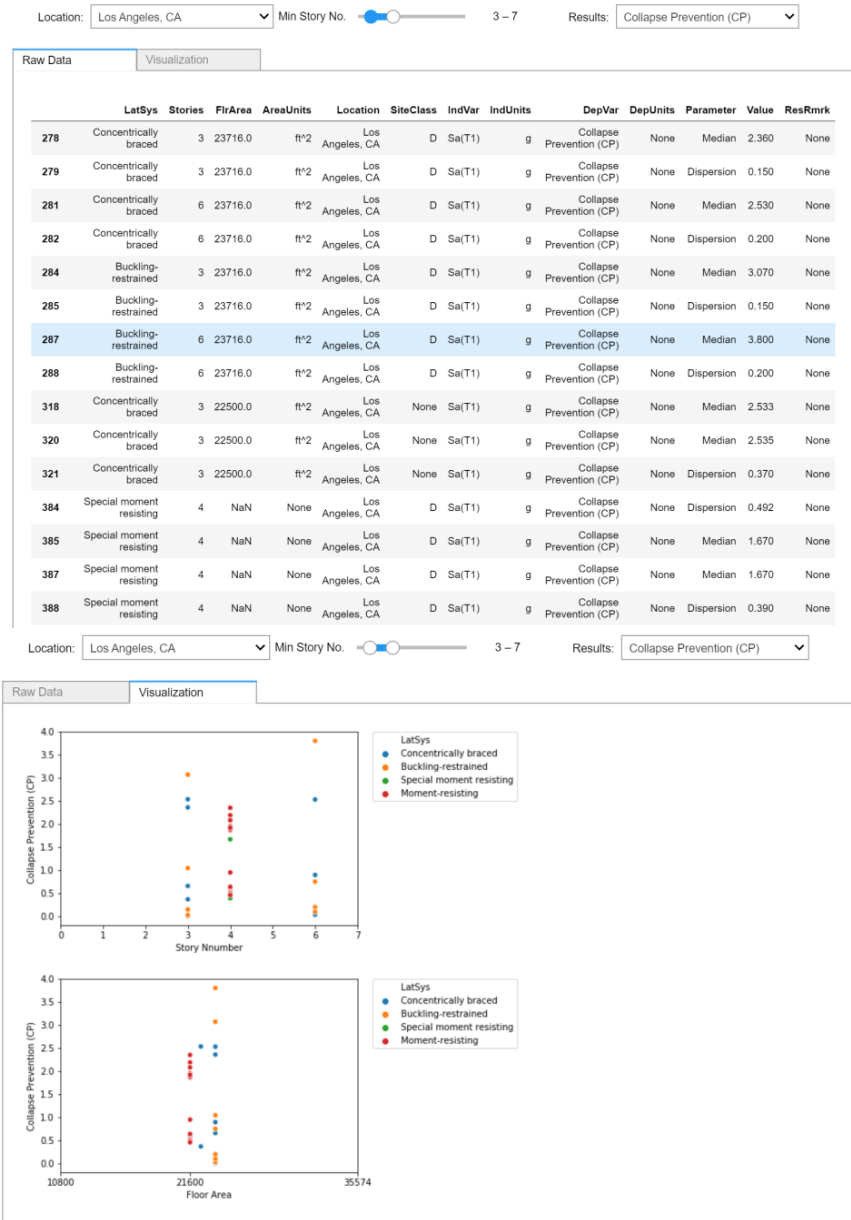


Figure 11: INSSEPT interactive tool Jupyter notebook. This figure shows the median collapse prevention fragility results for 3 to 7 story building in Los Angeles

## B INSSEPT LOG

-Release version: 1.0.3

-Date: 11/22/2019

-Initial release

-Error log: regression slope from Tahir's simplified data ( encoded with values associated with "Slope-Linear" parameters) should be inverted. e.g. if value=40.0 , user should use 1/40.0