

NSDG-2026 • NATIONAL CAPACITY DEVELOPMENT PROGRAMME

# Overview of NSDG-2026

*Session 2 of 13*

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The Nigerian Institution of Structural Engineers

Tuesday • 09 June 2026 • 19:00 hrs (Nigerian Time) • Zoom Webinar

# From Session 1 to Session 2

*Last week we asked WHY. Tonight we look at WHAT.*

## SESSION 1 — LAST WEEK

### *Introduction to Seismic Risk in Nigeria*

- Nigeria is intraplate — not aseismic
- 10+ events instrumentally recorded since 1933
- Six identifiable seismogenic zones
- Other intraplate nations acted only after damage
- Five drivers make 2026 the time to act

## SESSION 2 — TONIGHT

### *Overview of NSDG-2026*

- What NSDG-2026 contains — the architecture
- How it is organised — chapters and clauses
- How it relates to other codes
- How to navigate it on a real project
- A worked example — finding what you need

# Session Objectives

*By the end of this session you will be able to —*

- 1 Describe** the scope, status and authority of NSDG-2026
- 2 Navigate** the document by chapter, clause and annex
- 3 Identify** where the key technical provisions sit
- 4 Map** NSDG clauses to EC8 and ASCE 7 counterparts
- 5 Apply** the navigation flow on a worked example
- 6 Plan** your firm's transition to NSDG-2026

# NSDG-2026 — At a Glance

*What this document is, and what it is not*

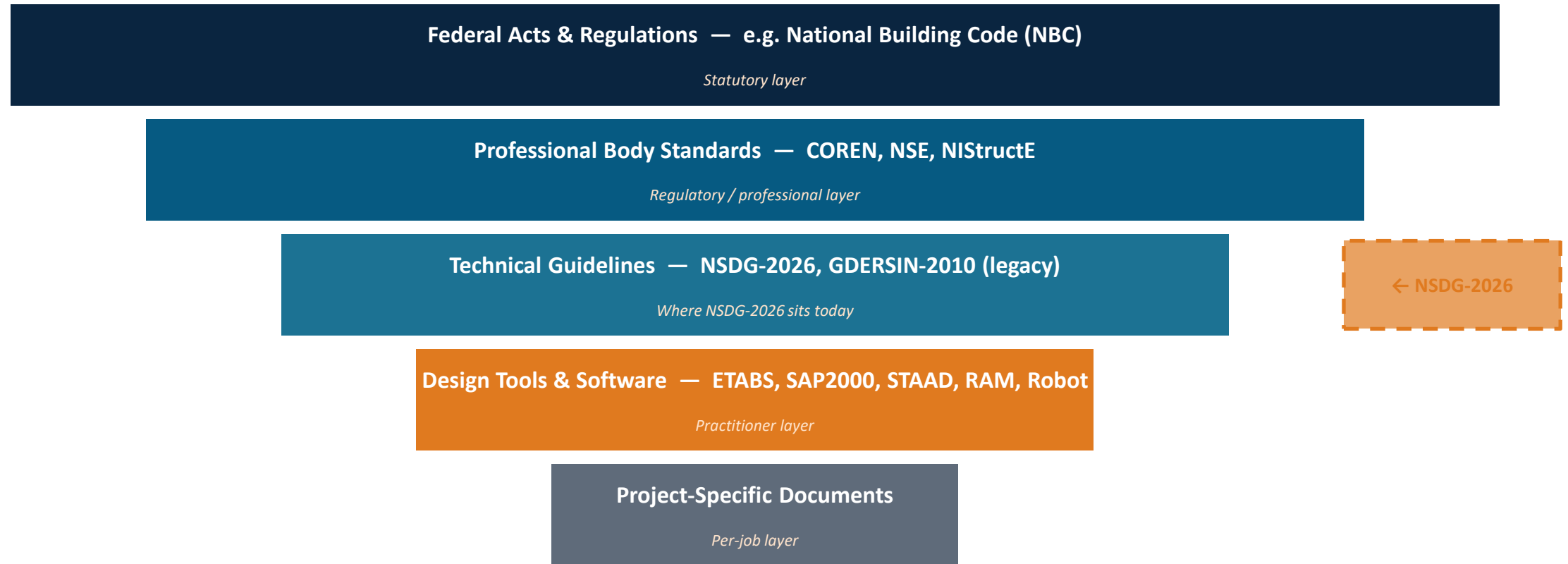
|                    |                                                                                    |
|--------------------|------------------------------------------------------------------------------------|
| <b>Full title</b>  | Nigerian Seismic Design Guidelines, 2026 edition                                   |
| <b>Short title</b> | NSDG-2026                                                                          |
| <b>Publisher</b>   | The Nigerian Institution of Structural Engineers                                   |
| <b>Status</b>      | National professional reference; pre-statutory                                     |
| <b>Authority</b>   | Endorsed by COREN and NSE; under engagement for code adoption                      |
| <b>Parent code</b> | Harmonised with EC8 (BS EN 1998); cross-referenced to ASCE 7                       |
| <b>Replaces</b>    | GDERSIN-2010 (Guidelines for Designing Earthquake-Resistant Structures in Nigeria) |
| <b>Scope</b>       | Buildings and building-like structures; conventional materials                     |
| <b>Audience</b>    | Practising structural engineers, plan-review officers, educators                   |

## Not in scope (for 2026 edition):

- Large dams and major hydraulic structures
- Nuclear and radiological facilities
- Long-span bridges (>100 m)
- Offshore structures
- Liquid storage tanks (specialist annex pending)
- Pipelines and lifelines (separate guide planned)
- Heritage / unreinforced masonry retrofit (Annex F — informative)

# Where NSDG-2026 Sits

*A national guideline today; a candidate for the National Building Code tomorrow*



*NSDG-2026 is currently a professional guideline — authoritative, not statutory. Sub-Committee 4 of the NAIP is engaging COREN, NSE and the NBC review process toward formal incorporation.*

# Anatomy of the Document

*Four parts, twelve chapters, six annexes*

## FRONT MATTER

**Foreword** — *by NIStructE President*

**Foreword** — *by COREN President*

**Foreword** — *by NSE President*

**Preface** — *drafting committee history*

**Acknowledgements**

**Table of Contents**

**List of Figures**

**List of Tables**

**Notation & Symbols** — *consistent with EC8*

## MAIN BODY (12 CHAPTERS)

- Ch 1** General
- Ch 2** Basis of Design
- Ch 3** Seismic Action
- Ch 4** Design of Buildings
- Ch 5** Specific Rules — RC
- Ch 6** Specific Rules — Steel
- Ch 7** Specific Rules — Composite
- Ch 8** Specific Rules — Masonry
- Ch 9** Specific Rules — Timber
- Ch 10** Foundations
- Ch 11** Detailing
- Ch 12** Assessment & Retrofit

## ANNEXES (6)

**Annex A** Nigerian Seismic Hazard Maps  
*Normative*

**Annex B** Soil Classification & Site Effects  
*Normative*

**Annex C** Worked Examples  
*Informative*

**Annex D** Cross-Reference with EC8 & ASCE 7  
*Informative*

**Annex E** Simplified Method for Small Buildings  
*Normative*

**Annex F** Heritage & URM Retrofit Guidance  
*Informative*

# Representative Table of Contents

*Final clause numbering may adjust at publication — structure indicative*

|          |                                                                                                           |           |                                                                                                   |
|----------|-----------------------------------------------------------------------------------------------------------|-----------|---------------------------------------------------------------------------------------------------|
| <b>1</b> | <b>General</b><br><i>1.1 Scope • 1.2 Normative refs • 1.3 Terms • 1.4 Symbols</i>                         | <b>7</b>  | <b>Composite Structures</b><br><i>7.1 Materials • 7.2 Connections • 7.3 Slabs • 7.4 Frames</i>    |
| <b>2</b> | <b>Basis of Design</b><br><i>2.1 Performance reqs • 2.2 Reliability • 2.3 Limit states</i>                | <b>8</b>  | <b>Masonry Structures</b><br><i>8.1 Materials • 8.2 Confined masonry • 8.3 Reinforced masonry</i> |
| <b>3</b> | <b>Seismic Action</b><br><i>3.1 Seismic zones • 3.2 Ground types • 3.3 Spectrum • 3.4 Comb.</i>           | <b>9</b>  | <b>Timber Structures</b><br><i>9.1 Materials • 9.2 Ductility classes • 9.3 Connections</i>        |
| <b>4</b> | <b>Design of Buildings</b><br><i>4.1 General • 4.2 Regularity • 4.3 Analysis • 4.4 Verification</i>       | <b>10</b> | <b>Foundations</b><br><i>10.1 Site effects • 10.2 Bearing • 10.3 Piles • 10.4 Retaining</i>       |
| <b>5</b> | <b>Reinforced Concrete</b><br><i>5.1 Materials • 5.2 DCL/DCM • 5.3 Frames • 5.4 Walls • 5.5 Detailing</i> | <b>11</b> | <b>Detailing</b><br><i>11.1 RC detailing • 11.2 Steel detailing • 11.3 Connections</i>            |
| <b>6</b> | <b>Steel Structures</b><br><i>6.1 Materials • 6.2 Behaviour factors • 6.3 MRF • 6.4 CBF • 6.5 EBF</i>     | <b>12</b> | <b>Assessment &amp; Retrofit</b><br><i>12.1 Existing structures • 12.2 Retrofit strategies</i>    |

*Plus: 6 annexes (A–F), full notation list, cross-reference index, and worked-example library.*

# Chapter 1 — General

*The gateway clauses — scope, definitions, symbols*

## Clause 1.1

### Scope

What types of structures NSDG covers, and what it explicitly excludes. Read this first — every project starts here.

## Clause 1.2

### Normative References

Other codes invoked: EC0 (basis), EC1 (loads), EC2 (RC), EC3 (steel), EC8 (seismic). Read with NSDG, not instead of it.

## Clause 1.3

### Terms & Definitions

Critical terminology: DCL/DCM/DCH, importance class, reference PGA, soil type. Familiarity is non-negotiable.

## Clause 1.4

### Symbols & Notation

EC8-aligned. If you know EC8 symbols, NSDG reads naturally. Annex listing in front matter.

**Practitioner tip:** Most clause-citation errors in seismic submissions arise from missing the scope (1.1) or invoking the wrong reference symbol. Read Chapter 1 fully — once.

# Chapter 2 — Basis of Design

*Performance objectives, importance classes, and reliability framework*

## Importance Classes (Clause 2.2)

| Class | Category  | Factor           | Examples                 |
|-------|-----------|------------------|--------------------------|
| I     | Minor     | $\gamma_i = 0.8$ | Agric, low-occupancy     |
| II    | Ordinary  | $\gamma_i = 1.0$ | Residential, offices     |
| III   | Important | $\gamma_i = 1.2$ | Schools, assembly halls  |
| IV    | Critical  | $\gamma_i = 1.4$ | Hospitals, fire stations |

*Note:  $\gamma_i$  scales the seismic action — higher importance class produces higher design demand.*

## Performance Levels (Clause 2.1)

### ULS — No-Collapse

**475-year return period • 10% in 50 years**

*Life safety preserved. Significant damage permitted; structure must not collapse.*

### SLS — Damage-Limitation

**95-year return period • 10% in 10 years**

*Limited damage. Serviceability preserved. Rapid return to occupancy.*

# Chapter 3 — Seismic Action

*Where the demand is defined — the engine of the whole document*

## Clause 3.1

### Seismic Zones

Three zones (Z1, Z2, Z3) with reference PGA values. Zone map in Annex A.

## Clause 3.2

### Ground Types

Five types (A–E) by shear-wave velocity. Site-specific characterisation required.

## Clause 3.3

### Response Spectrum

Type 1 and Type 2 spectra.  $T_B$ ,  $T_C$ ,  $T_D$  corner periods per ground type.

## Clause 3.4

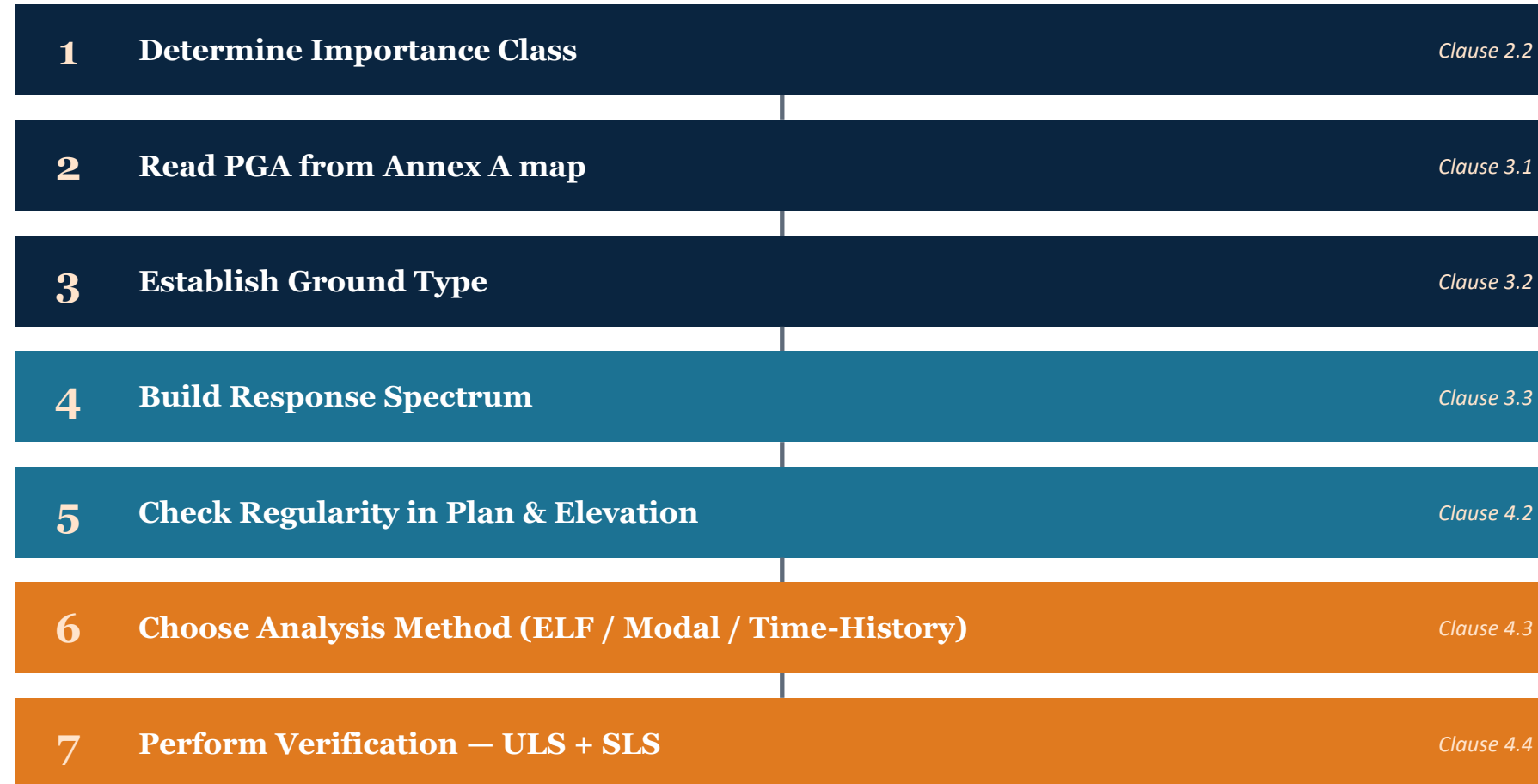
### Combinations

Seismic combination per EC0:  $\Sigma G_k + \Sigma \psi_{E,i} \cdot Q_{k,i} + A_{Ed}$ .  $\psi_{E,i}$  values in Table 3.5.

*Chapter 3 is the most-cited chapter in any seismic submission. Become fluent in it first.*

# Chapter 4 — Design of Buildings

*The decision tree every project follows*



# Chapters 5–9 — Material-Specific Rules

*Detailing requirements organised by structural material*

| Ch | Material             | Ductility Classes (DC)          | Focus / Notes                                        |
|----|----------------------|---------------------------------|------------------------------------------------------|
| 5  | Reinforced Concrete  | DCL • DCM • DCH                 | Frames, walls, dual systems. q-factors 1.5 – 5.0.    |
| 6  | Steel                | DCL • DCM • DCH                 | MRF, CBF, EBF. q-factors 1.5 – 6.5.                  |
| 7  | Composite (Steel-RC) | DCM • DCH                       | Composite frames, slabs. Connection design critical. |
| 8  | Masonry              | Unrein. • Confined • Reinforced | Confined masonry preferred. URM very restricted.     |
| 9  | Timber               | DCL • DCM • DCH                 | Connection-driven ductility. Engineered timber only. |

**Ductility Class Logic:** **DCL** (Low) — minimum requirements; **DCM** (Medium) — standard for Zones 1–2; **DCH** (High) — recommended for Zone 3 and important structures.  
*Choice of DC drives the q-factor (R-equivalent), the detailing, and ultimately the cost of compliance.*

# Chapters 10–12 — Foundations, Detailing & Retrofit

*Three chapters that close the design loop*

## Chapter 10

### Foundations

- Site effects and ground response (CI 10.1)
- Spread footings, bearing capacity under cyclic load (CI 10.2)
- Pile design — kinematic + inertial effects (CI 10.3)
- Retaining structures and earth pressures (CI 10.4)

## Chapter 11

### Detailing

- RC detailing — column ties, beam stirrups, joints (CI 11.1)
- Steel detailing — connections, panel zones (CI 11.2)
- Connection design — fully restrained vs partially (CI 11.3)
- Capacity design principles throughout

## Chapter 12

### Assessment & Retrofit

- Assessment of existing structures (CI 12.1)
- Retrofit strategies — jacketing, FRP, base isolation (CI 12.2)
- Performance-based assessment methods
- Critical for upgrading Nigerian existing stock

# The Six Annexes — Where Tools Live

*Normative annexes carry design weight; informative annexes guide practice*

| Annex | Title                               | Status      | What's in it / Why you'll open it                                                         |
|-------|-------------------------------------|-------------|-------------------------------------------------------------------------------------------|
| A     | Nigerian Seismic Hazard Maps        | Normative   | Reference PGA contour maps. Open once per project to read your zone.                      |
| B     | Soil Classification & Site Effects  | Normative   | Tables for Vs-30, ground types, amplification factors. Open with geotechnical report.     |
| C     | Worked Examples                     | Informative | Low-, medium-, high-rise examples — the same ones developed in Sessions 10.1–10.3.        |
| D     | Cross-Reference: EC8 & ASCE 7       | Informative | Clause-by-clause map. Essential when transitioning from foreign-code practice.            |
| E     | Simplified Method — Small Buildings | Normative   | Streamlined procedure for buildings up to 3 storeys in Zones 1 and 2.                     |
| F     | Heritage / URM Retrofit Guidance    | Informative | Indicative methods for unreinforced masonry — not a substitute for specialist assessment. |

*Normative annex = binding requirement. Informative annex = guidance — read for orientation, not citation.*

# Cross-Reference with EC8 and ASCE 7

*Excerpt from Annex D — clause-by-clause mapping for transitioning engineers*

| Concept              | NSDG-2026             | EC8 (BS EN 1998)        | ASCE 7-22                        | Notes                                   |
|----------------------|-----------------------|-------------------------|----------------------------------|-----------------------------------------|
| Reference PGA        | CI 3.1, Annex A       | CI 3.2.1, agR           | Section 11.4 (SS, S1)            | Different parameter names; same concept |
| Ground types         | CI 3.2, Annex B       | CI 3.1.2                | Section 20.3 (Site Class)        | A–E in both EC8 & NSDG; A–F in ASCE 7   |
| Importance factor    | CI 2.2 ( $\gamma_i$ ) | CI 4.2.5 ( $\gamma_I$ ) | Section 11.5 (I <sub>e</sub> )   | Same role; NSDG uses 4 classes          |
| Behaviour / R factor | CI 4.3 (q)            | CI 5/6 (q-factor)       | Table 12.2-1 (R)                 | EC8 q ↔ ASCE 7 R — same concept         |
| Response spectrum    | CI 3.3                | CI 3.2.2                | Section 11.4.6 (design spectrum) | EC8 form adopted in NSDG                |
| Drift limits         | CI 4.4.3              | CI 4.4.3.2              | Table 12.12-1                    | Similar storey-drift caps               |
| Capacity design      | CI 11, throughout     | CI 5.2.3, 6.2           | Section 12.2.5                   | Strong-column / weak-beam principle     |

*Full mapping in Annex D. Use it when you inherit a project designed to EC8 or ASCE 7, or when you transition the other way.*

# Worked Example — A Live Project

*How an engineer uses NSDG-2026 from receipt of brief to design report*

## PROJECT BRIEF

### A new 6-storey RC office building in Ibadan, Oyo State.

*Plan: rectangular 24 m × 14 m, regular in plan and elevation. Storey height: 3.2 m. Total height: 19.2 m. Use: office. Site: residual lateritic soil over weathered basement. Client requests NSDG-2026 compliance.*

### *Five questions you must answer — and where in NSDG-2026 each one lives:*

- ? What is the importance class? Ch 2.2
- ? What is the reference PGA for the site? Annex A + Cl 3.1
- ? What is the ground type? Annex B + Cl 3.2
- ? Which analysis method is applicable? Cl 4.3
- ? Which ductility class will we adopt? Cl 4.3 + Ch 5

# Worked Example — Walking the Document

Each answer found by opening NSDG-2026 at the right clause

1

**Importance Class** C1 2.2

Office building, ordinary occupancy.

→ **Class II •  $\gamma_i = 1.0$**

2

**Reference PGA** Annex A + C1 3.1

Ibadan sits in the Ijebu-Ode / Ibadan Belt — Zone 3.

→ **agR = 0.15 g (indicative)**

3

**Ground Type** Annex B + C1 3.2

Residual lateritic over weathered basement;  $V_{s,30} \approx 360\text{--}400$  m/s.

→ **Ground Type C**

4

**Analysis Method** C1 4.3

6 storeys, regular plan/elevation,  $T_1 \approx 0.7$  s.

→ **ELF method applicable**

5

**Ductility Class** C1 4.3 + Ch 5

Zone 3, importance II, RC frame structure.

→ **DCM •  $q \approx 3.45$**

# What Changes in Your Workflow

*Before NSDG-2026 vs after — three concrete shifts*

## Step that changes: site characterisation

**BEFORE:** Geotechnical report gives bearing capacity only.

**AFTER:** Geotechnical report also gives Vs-30 → ground type → spectrum.

## Step that changes: load combinations

**BEFORE:** Dead + live + wind (BS / EC1 only).

**AFTER:** Add seismic combination per NSDG Cl 3.4 with  $\psi$ E factors.

## Step that changes: detailing review

**BEFORE:** Plan-review checks bar diameters and spacings only.

**AFTER:** Plan-review also checks column ties, beam-column joints, capacity design.

# Transitioning Your Firm to NSDG-2026

*A practical 90-day plan*

## 1 Days 0–30 • Familiarisation

- Order or download NSDG-2026 — official copy
- Walk the Table of Contents and Annex listing
- Read Chapter 1 and Chapter 2 cover-to-cover
- Brief the whole technical team in one staff session

## 2 Days 31–60 • Pilot Application

- Pick one live or recently completed project
- Re-run the design under NSDG-2026 in parallel
- Identify what software entries change
- Document the differences — your firm's internal note

## 3 Days 61–90 • Standard Practice

- Update firm design templates and calc sheets
- Update CAD/BIM detailing libraries
- Set design submissions to default to NSDG-2026
- Nominate one partner as the firm's NSDG champion

# Common First-Project Mistakes

*What other early adopters got wrong — and how to avoid it*



## Skipping Chapter 1

**Fix:** Read CI 1.1 (Scope) and CI 1.3 (Definitions). Every project starts there.



## Mis-reading the hazard map

**Fix:** Always confirm by coordinates, not by guess. Use Annex A figure caption carefully.



## Wrong ground type

**Fix:** Don't assume Type B 'looks reasonable'. Use Vs-30 from geotechnical, or default conservatively.



## Choosing DCH for prestige

**Fix:** DCH demands stricter detailing — choose DCM unless real benefit justifies the cost.



## Ignoring SLS

**Fix:** ULS (no-collapse) and SLS (damage-limitation) are both binding. Check both.



## Treating Annex F as normative

**Fix:** Annex F (URM retrofit) is informative. Specialist assessment still required.

# Questions & Discussion

## Q&A

*15 minutes • please type questions in the chat or raise hand*

**Suggested questions to start us off:**

- ▶ *Have you started reading NSDG-2026? Which clause are you finding hardest to interpret?*
- ▶ *Does your software default to EC8 parameters? What's the workaround you use?*
- ▶ *Will your firm pilot NSDG-2026 on an existing project, or wait for a new one?*

# THANK YOU

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Next Tuesday — Session 3

## Seismic Loads & Basic Concepts

Lead: Engr. J. Okovido | Co-Presenter: Engr. R. A. Shola Sanni

Tuesday • 16 June 2026 • 19:00 hrs (Nigerian Time)

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***Take home: Open NSDG-2026 this week. Walk the TOC. Read Chapters 1 and 2.***

The Nigerian Institution of Structural Engineers

***"Build now what we don't want to rebuild later."***