ASOF ANNUAL MEETING

JUNE 26-28, 2025

DILIJAN, ARMENIA

THE ARMENIAN SOCIETY OF FELLOWS

Ճանաչել զիմաստութիւն եւ զխրատ, իմանալ զբանս հանճարոյ

Dilijan

June 26, 2025-J

THE ARMENIAN SOCIETY OF FELLOWS

Մեծարգո ՀՀ վարչապետ Նիկոլ Փաշինյանին

Վարչապետի աշխատակազմ
ՀՀ, ք. Երևան, 0010, Հանրապետության հրապարակ,
Կառավարական տուն 1

24 օգոստոս, 2024

Հարգելի պարոն Վարչապետ,

Մենք դիմում ենք Ձեզ «Հայ մշակութային և գիտական ընկերակցություն» հիմնադրամի (ASOF) անունից: Հիմնադրամը համախմբում է Հայաստանի և Սփյուռքի հայազգի վաստակաշատ ու մեծահամբավ գիտնականներին և փորձագետներին, օգնում է համագործակցային կապեր հաստատել ու իրականացնել հայանպաստ ծրագրեր:

2023 թվականին Դիլիջանում կայացավ հիմնադրամի երկրորդ տարեկան համաժողովը, որին մասնակցում էին 188 գիտնականներ, մանկավարժներ և փորձագետներ՝ քննարկելու Հայաստանի զարգացման ռազմավարական կարևոր թեմաներ: Համաժողովի արդյունքում ձևավորվել է սեյսմիկ ճարտարագիտության և անվտանգության հարցերով մասնագիտական խումբ,

Seismic Safety

Charge

This group combines expertise in engineering and architecture, focused on helping Armenia develop policy and protocols with respect to seismic safety in construction.

Chair

Armen Martirossyan

Members

Marco Brambilla
Domus International Group; Professor of Architectural Preservation, Italy, Iran (retired)

Armen Der Kiureghian
Professor Emeritus, University of California, Berkeley

Martin Eskijian
Senior Engineer, Ocean/coastal structures

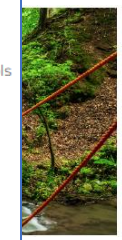
Armen Martirossyan
ARPA Technology Group, Principal

Armen Minassian
Architect, Assistant professor, and advisor to the NUACA, Member of EERI and AESA-NE

Yerevan 2024

June 26, 2024-June 28, 2024

Yerevan, Armenia



Dilijan 2023

June 26, 2023-June 28, 2023

Dilijan, Armenia

Venice 2022

June 26, 2022-June 28, 2022

Venice, Italy

SEISMIC SAFETY
ASOF SSTF-UDC COLLABORATION

SPITAK 1988

The panorama of the central part of Gyumri city before the Spitak earthquake (1987), immediately after the earthquake (1988) and after the reconstruction (2015)

Building type	Damage category	Number (percentage) in each category		
		Spitak	Kirovakan	Leninakan
Stone masonry	Collapsed	20 (80)	46 (19)	24 (5)
	Heavily damaged	2 (8)	53 (22)	160 (33)
	Moderately damaged	3 (12)	145 (59)	154 (31)
	No damage	-	-	150 (31)
Composite frame-stone	Collapsed	43 (73)	41 (7)	27 (12)
	Heavily damaged	9 (15)	89 (16)	115 (50)
	Moderately damaged	7 (12)	414 (72)	67 (29)
	No damage	-	27 (5)	20 (9)
Precast frame-panel	Collapsed	-	-	72 (54)
	Heavily damaged	-	-	55 (41)
	Moderately damaged	-	88 (81)	6 (5)
	No damage	-	20 (19)	-
Precast panel	Collapsed	-	-	-
	Heavily damaged	-	-	-
	Moderately damaged	-	-	-
	No damage	1 (100)	4 (100)	16 (100)

ASOF SEISMIC SAFETY

Armen Der Kiureghian
Taisei Professor of Civil Engineering Emeritus at the University of California Berkeley
Co-founder and President Emeritus of the American University of Armenia.
Elected foreign member of the National Academy of Engineering

Tigran Dadayan
Professor and Head of the Department of Building Structures of the National University of Architecture and Construction of Armenia

Shahen Akelyan
Assistant Deputy Superintendent of Building with the Department of Building and Safety, City of Los Angeles

Marco Giovanni Brambilla
Practicing Architect
University Professor, University of Pennsylvania, Columbia, National University of Iran, UCLA

Armen Minasian Assistant Professor, and advisor to the NUACA, Member of EERI and ASCE, and AESA-NE

Martin Eskijian
Retired Engineer from CA State Lands Commission
Co-developer of the ASCE Port Certificate program
Chair of the Lifeline subcommittee of CA Strong Motion Instrumentation Program

Shant Minas
Principal Geologist, Managing Director, Applied Earth Sciences

Ara Sargsyan
Building Official, Community Development, City of Glendale

Armil Allahyarian
Operations Manager, Plan check and Inspections, BUREAU VERITAS

Andre H. Tahmassian
Department of Civil and Environmental Engineering, Lehigh University

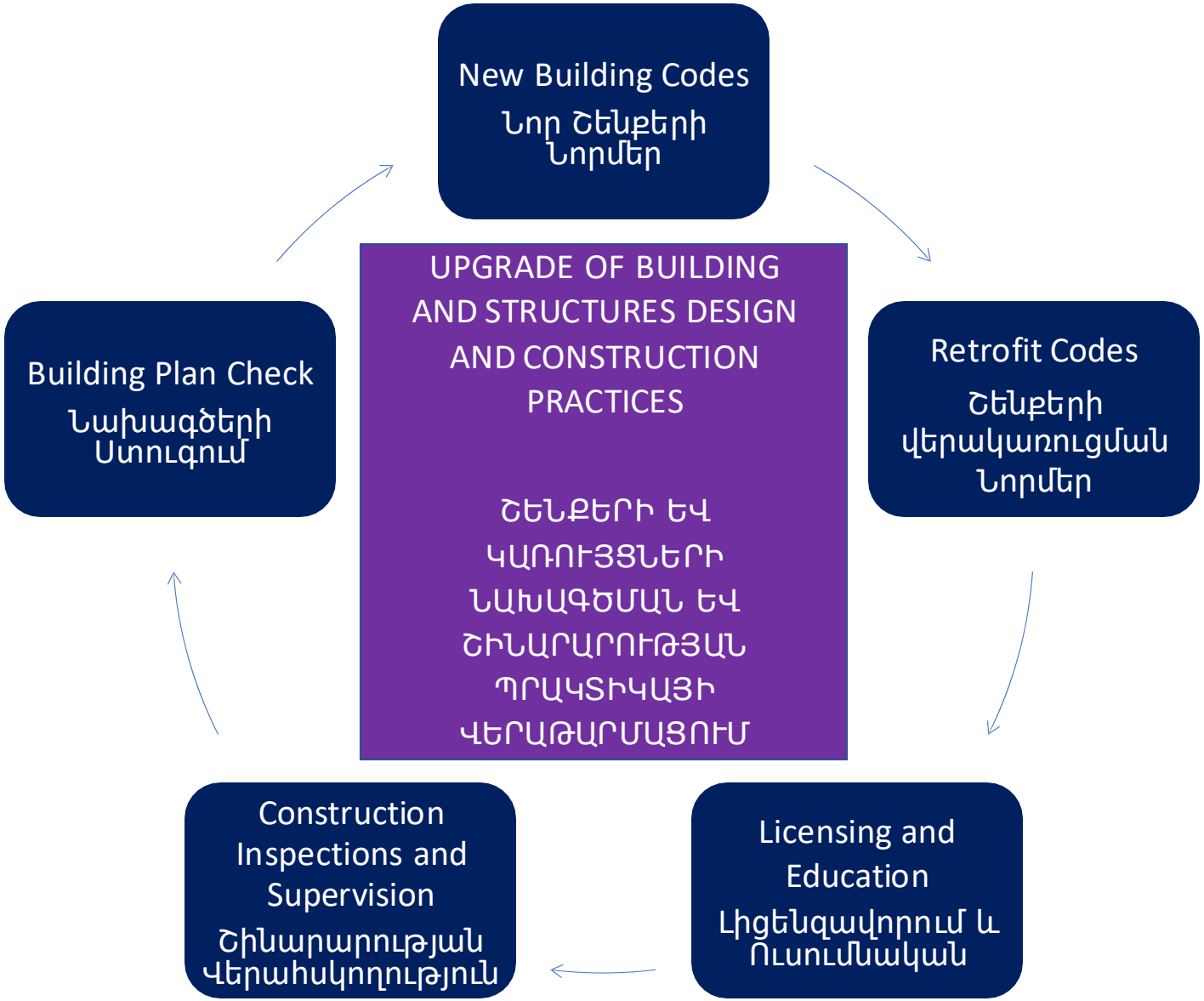
Gaianè Casnati
Architect and restorer specializing in cultural heritage preservation
Europa Nostra Council member and director of the SIREH Foundation

Petros Keshishian
Head of Model Engineering, Insurance Risk,
Project Manager of International Expert team of Armenia's School Seismic Protection Program.

Armen Martirossyan
ARPA Technology Group, Principal
Chief Engineer of International Expert Team of Armenia's School Seismic Protection Program

Armen Sarkisian
Senior Civil Engineer, Bureau of Engineering, Department of Public Works, City of Los Angeles

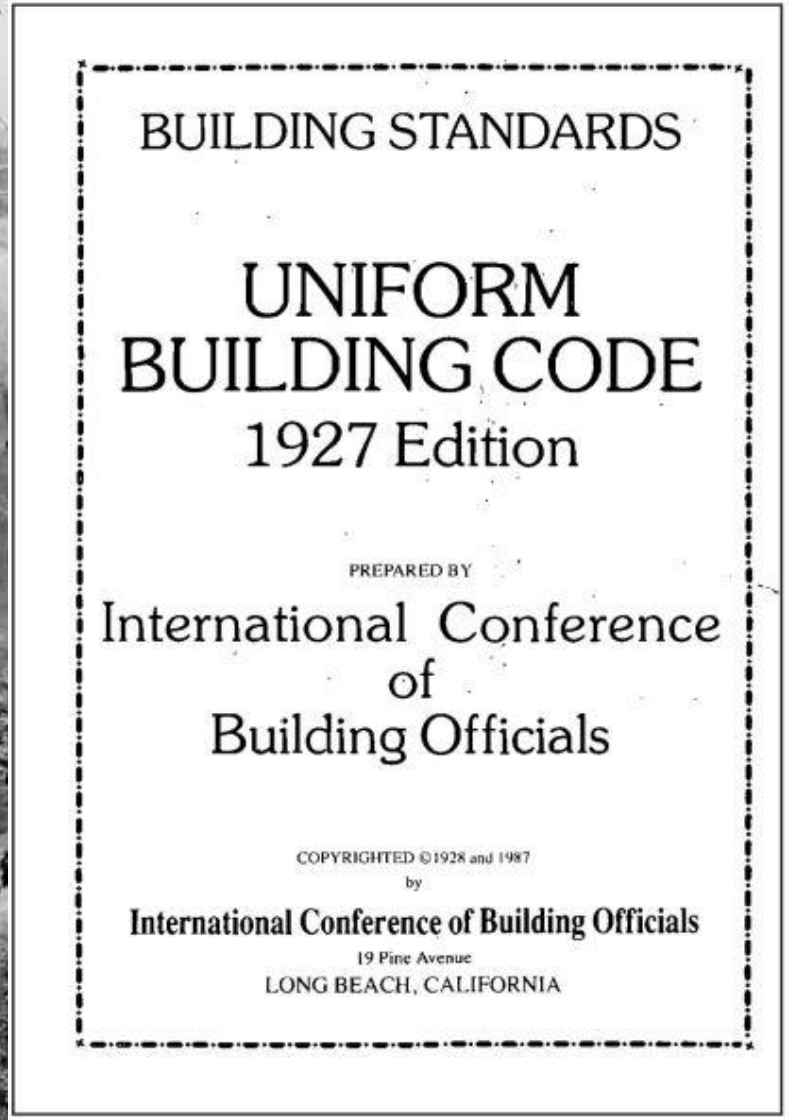
Peter Manarian
Senior structural engineer with 43 years of experience in Southern California and 11 years of experience in England.


New Building Codes
Նոր Շենքերի Նորմեր
Retrofit Codes
Շենքերի վերակառուցման Նորմեր
Licensing and Education
Լիցենզավորում և Ուսումնական
Construction Inspections and Supervision
Շինարարության Վերահսկողություն
Building Plan Check
Նախագծերի Ստուգում
UPGRADE OF BUILDING AND STRUCTURES DESIGN AND CONSTRUCTION PRACTICES
ՇԵՆՔԵՐԻ ԵՎ ԿԱՌՈՒՅՑՆԵՐԻ ՆԱԽԱԳԾՄԱՆ ԵՎ ՇԻՆԱՐԱՐՈՒԹՅԱՆ ՊՐԱԿՏԻԿԱՅԻ ՎԵՐԱԹԱՐՄԱՑՈՒՄ

NEW BUILDING CODES UPDATE

1906 San Francisco Earthquake

- 30 PSF (1.44 kPa) equivalent to wind
- Riley Act adopted 1920 – 2% of the building's weight or a minimum of 20 PSF (0.97 kPa)
- 30 PSF (1.44 kPa) քամուն համարժեք
- Ռայլի Ակտ – շենքի քաշի 2 % կամ մինիմում 20PSF (0.97 kPa)


BUILDING STANDARDS

UNIFORM BUILDING CODE

1927 Edition

PREPARED BY

International Conference of Building Officials

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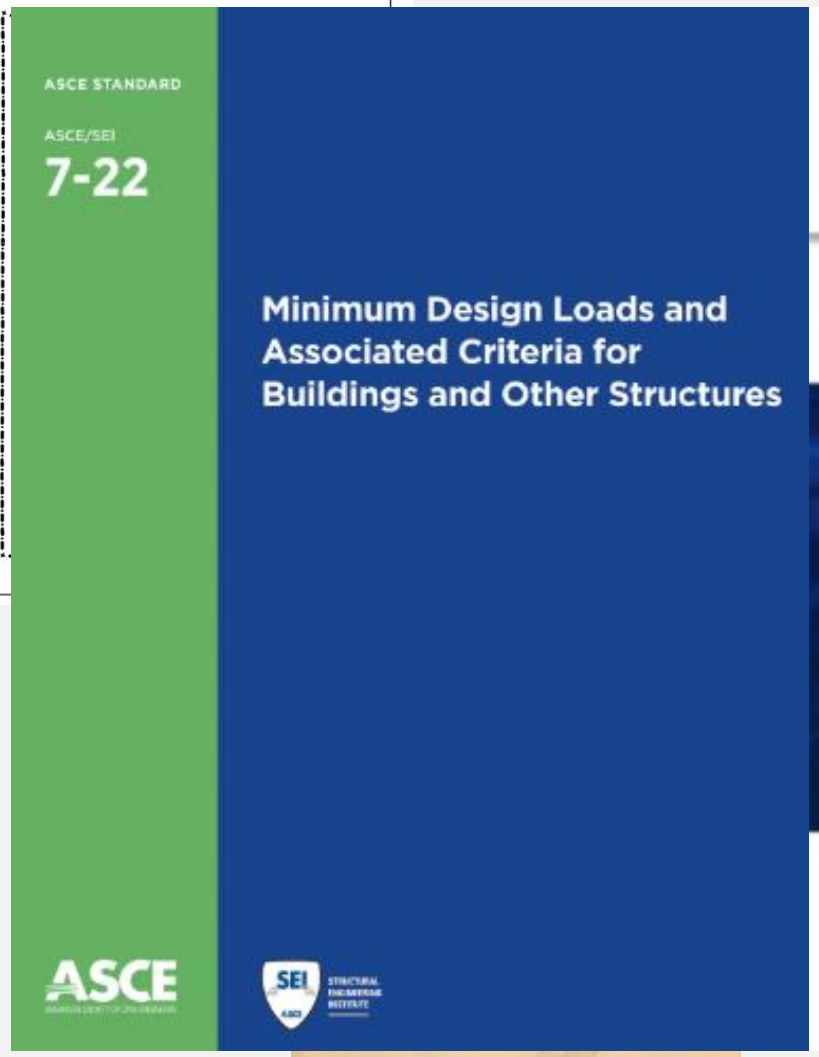
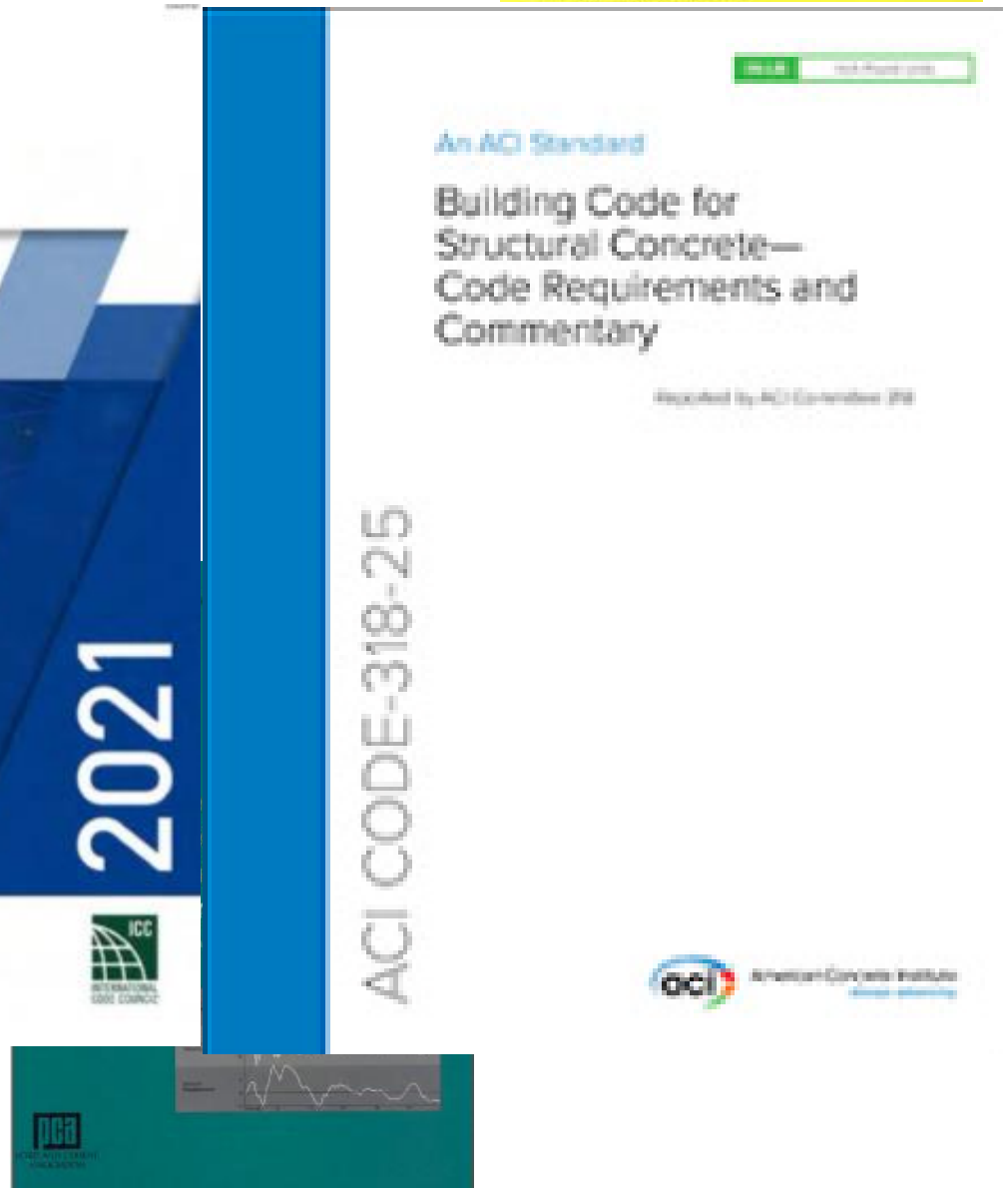
International Conference of Building Officials

19 Pine Avenue

LONG BEACH, CALIFORNIA

NEW BUILDING CODES UPDATE





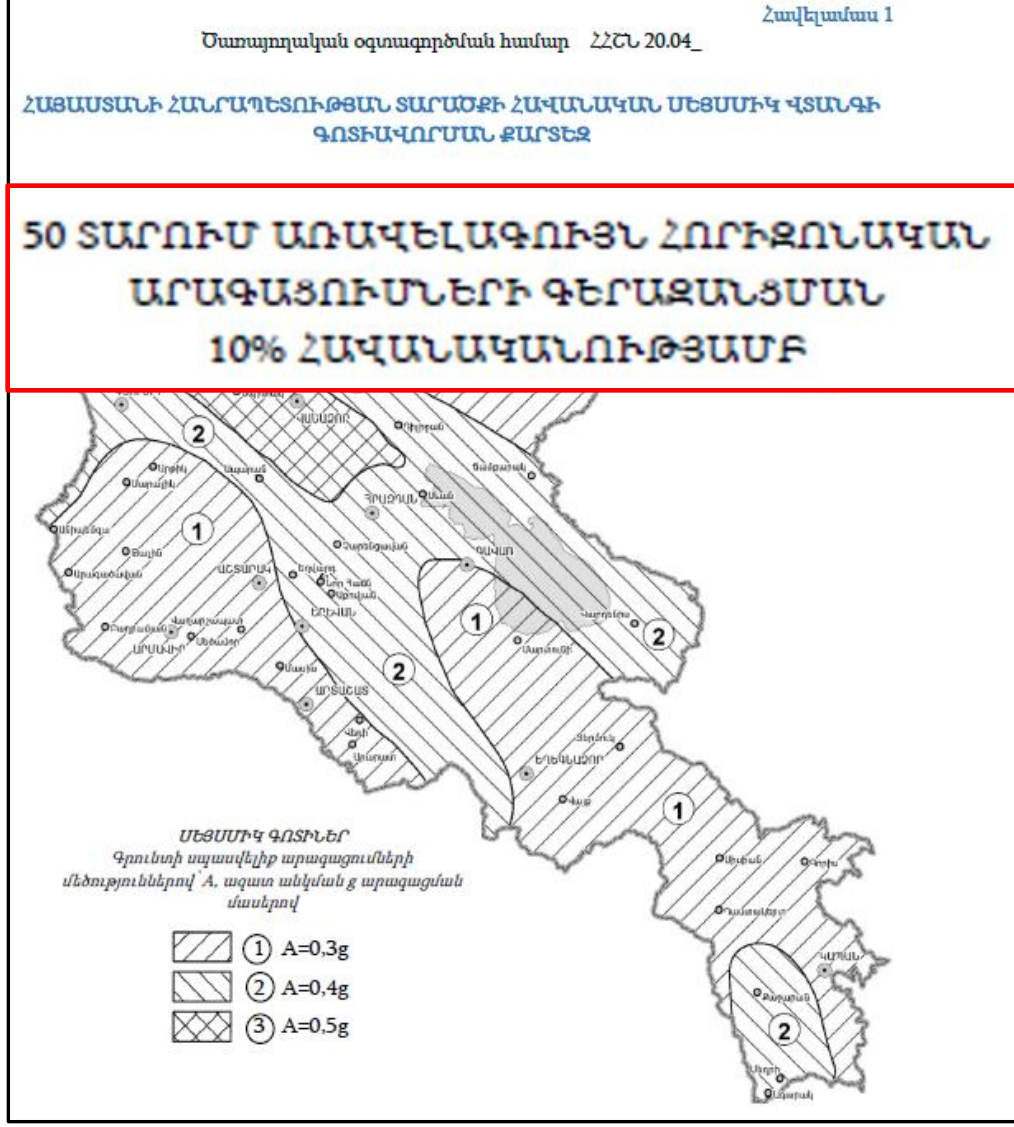
NEW BUILDING CODES UPDATE

ASCE 7-05 - **10% probability of exceedance in 50 years**, which corresponds to a **return period of approximately 475 years**.

ASCE 7-16 - **2% probability of exceedance in 50 years**, which corresponds to a **return period of approximately 2,475 years**.

ASCE 7-22 - **1% probability of exceedance in 50 years**, which corresponds to a **return period of approximately 4,975 years**.

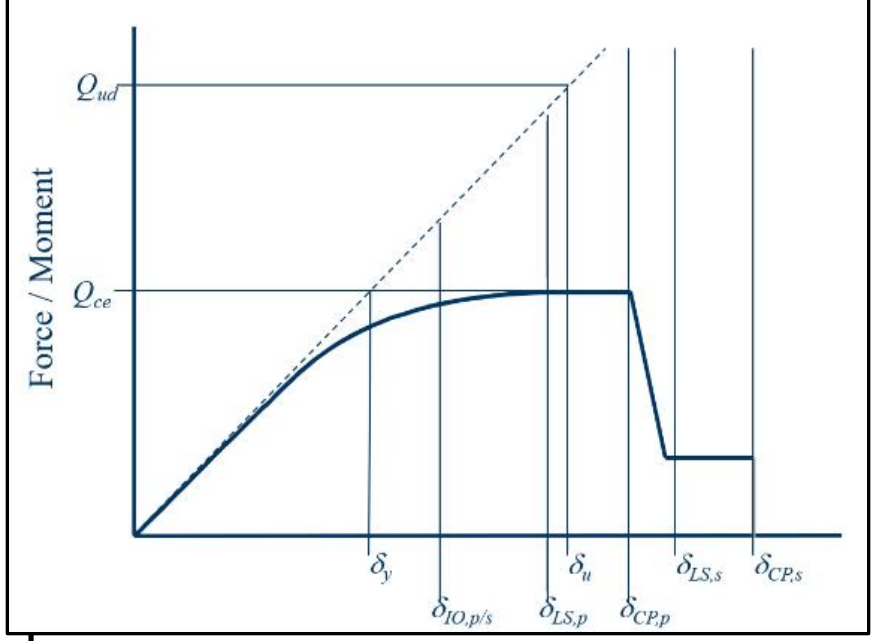
Armenia's seismic code - **10% probability of exceedance in 50 years**, which corresponds to a **return period of approximately 475 years**



NEW BUILDING CODES UPDATE

Building Performance Levels

- Collapse Prevention
- Limited Safety
- Life Safety
- Immediate Occupancy
- Operational



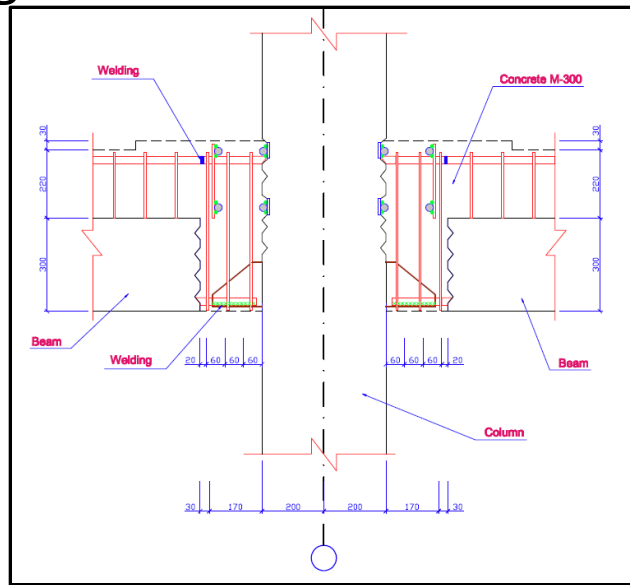
Design Elements

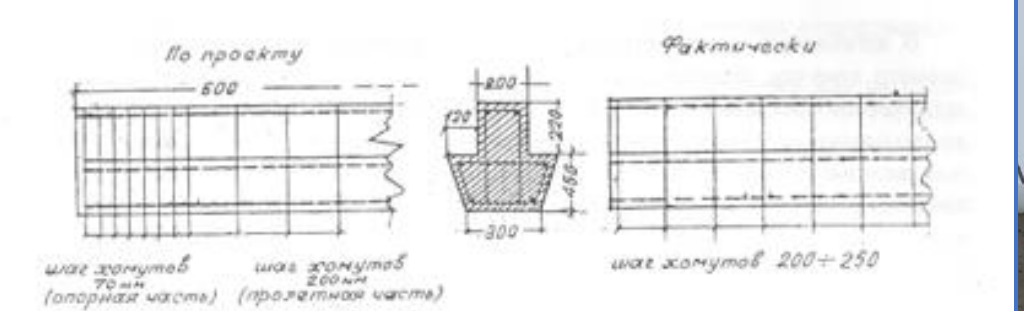
- Primary and Secondary Members
- Force Controlled and Deformation Controlled Elements
- Structural and Non-Structural Building Elements

Design Methodology

- Equivalent Lateral Force Procedure
- Response Spectrum Analysis
- Non-linear Static Analysis (Pushover Analysis)
- Non-Linear Time History Analysis

Connections Design





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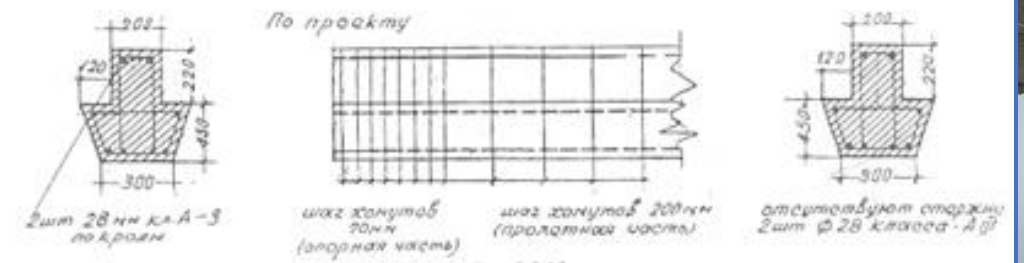

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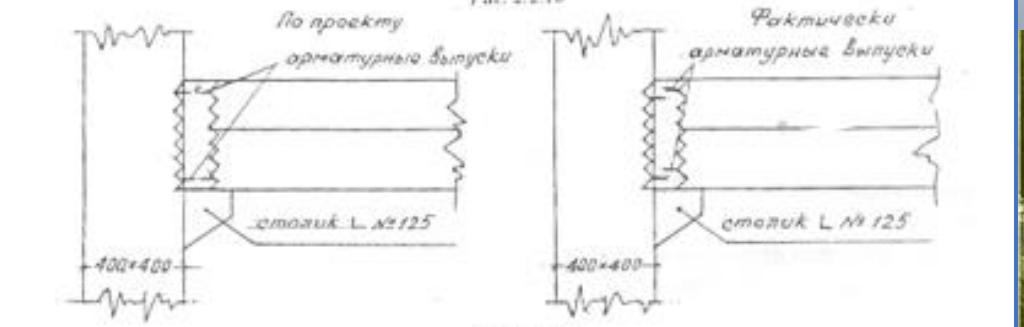

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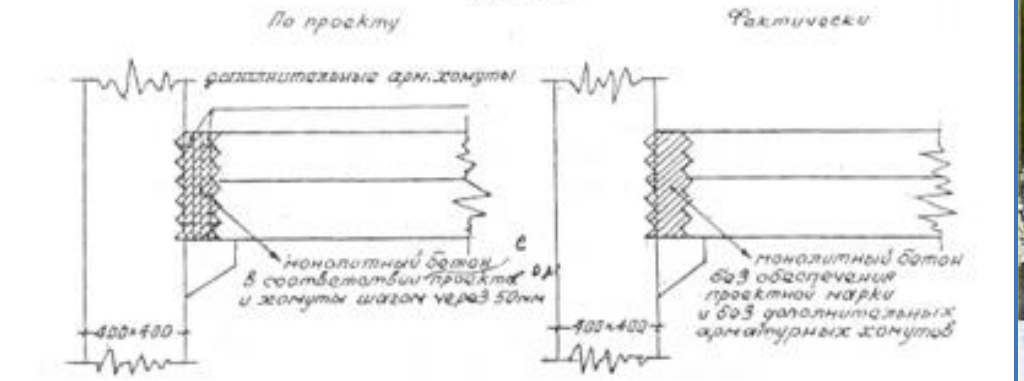

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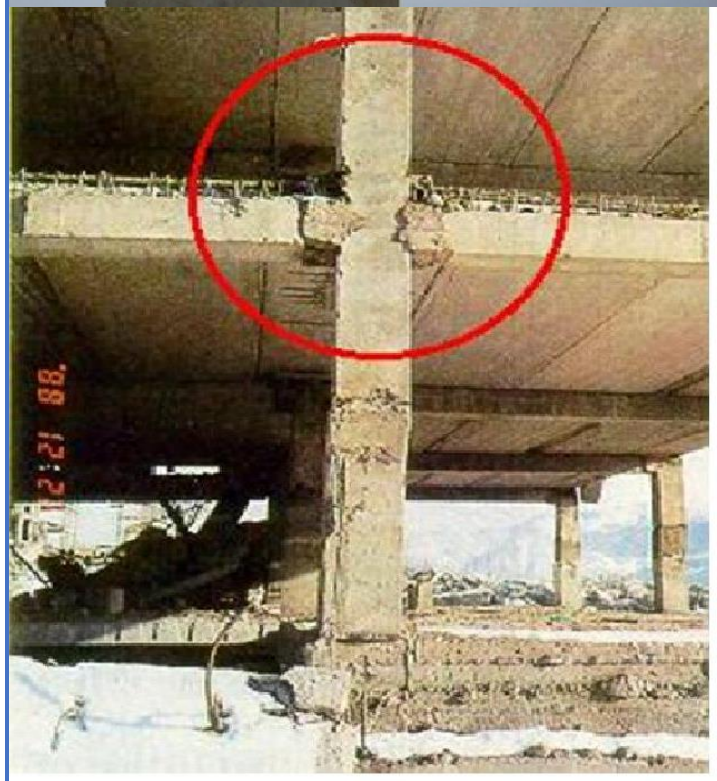
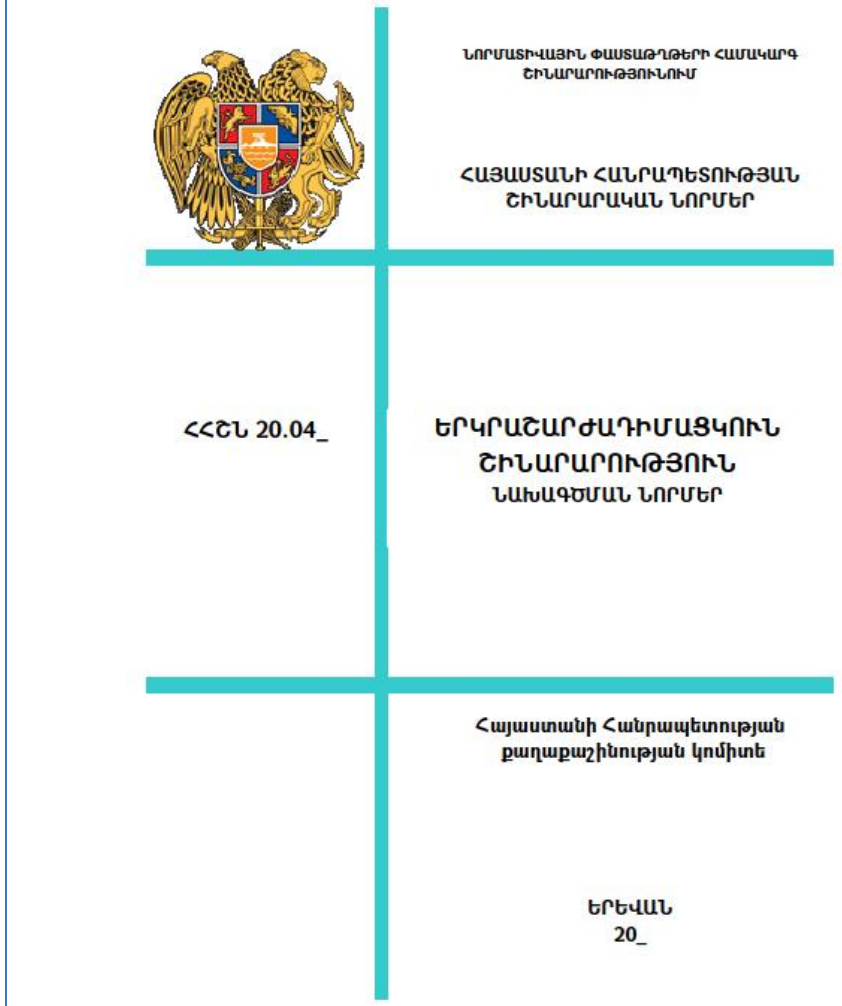


NEW BUILDING CODES UPDATE

- To adapt the main principals and design methodology of
  - IBC 2021
  - ACI 318
  - ASCE 7-22 standards to Armenian conditions.

- To harmonize these standards with existing Armenian codes.

- To engage stakeholders and build capacity for the implementation of these standards.



NEW BUILDING CODES UPDATE

Phase 1: Contextual Assessment

- Review and Identification of gaps and priorities for update

Phase 2: Technical Adaptation

Phase 3: Pilot Implementation

- Apply to new public buildings in Yerevan and regional centers.

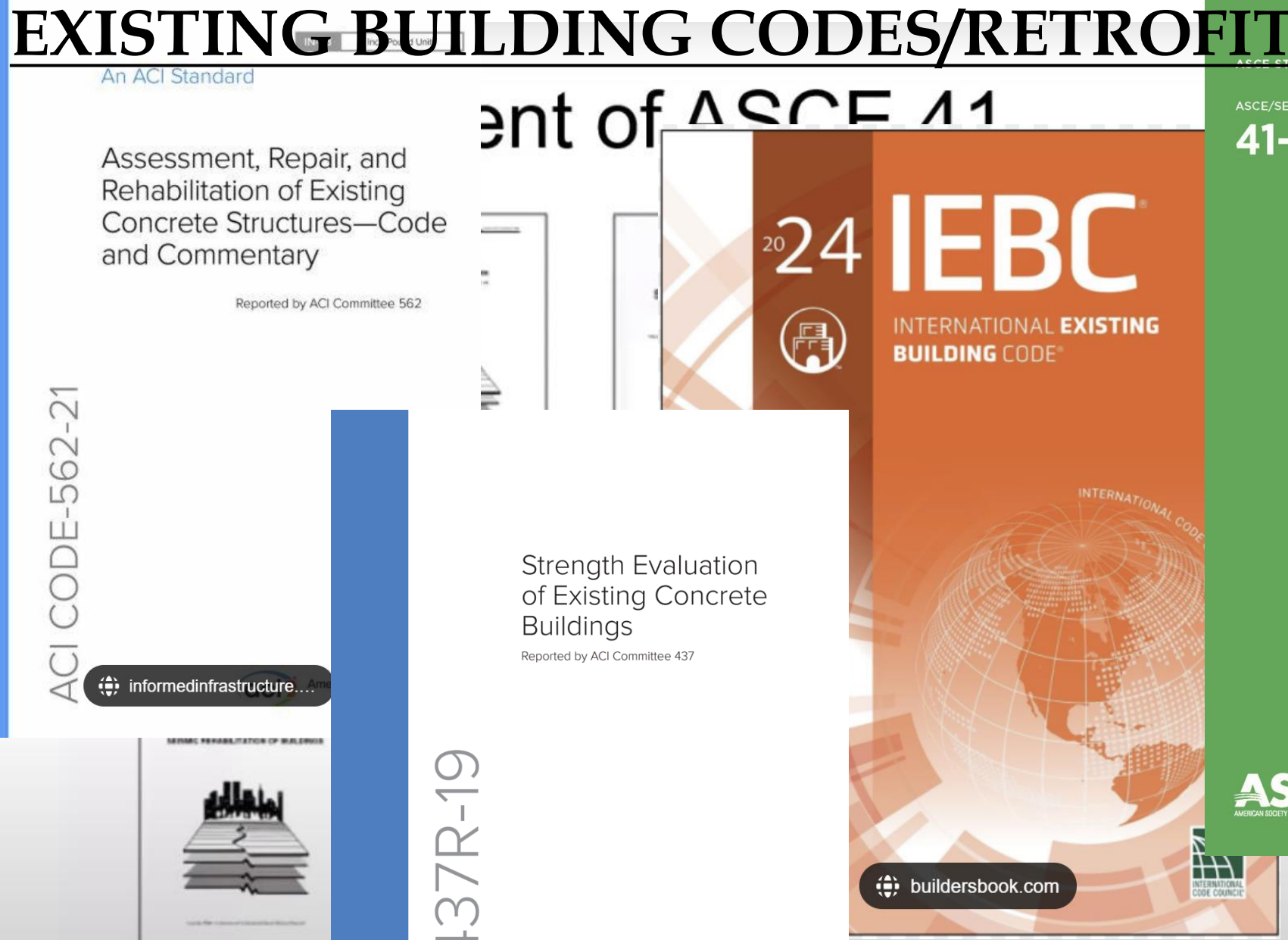
Phase 4: Institutionalization

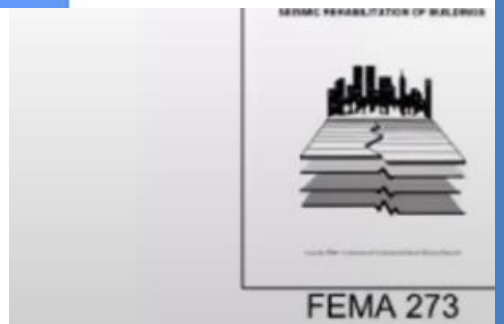
- Adoption of Urban Development Code with proper references
- Training and continuous education

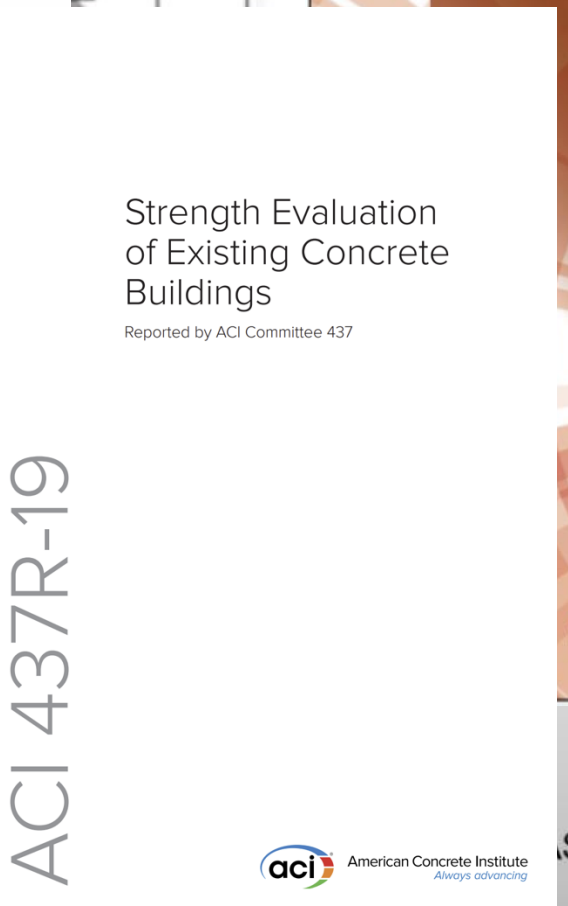
Phase 5: Knowledge Sharing

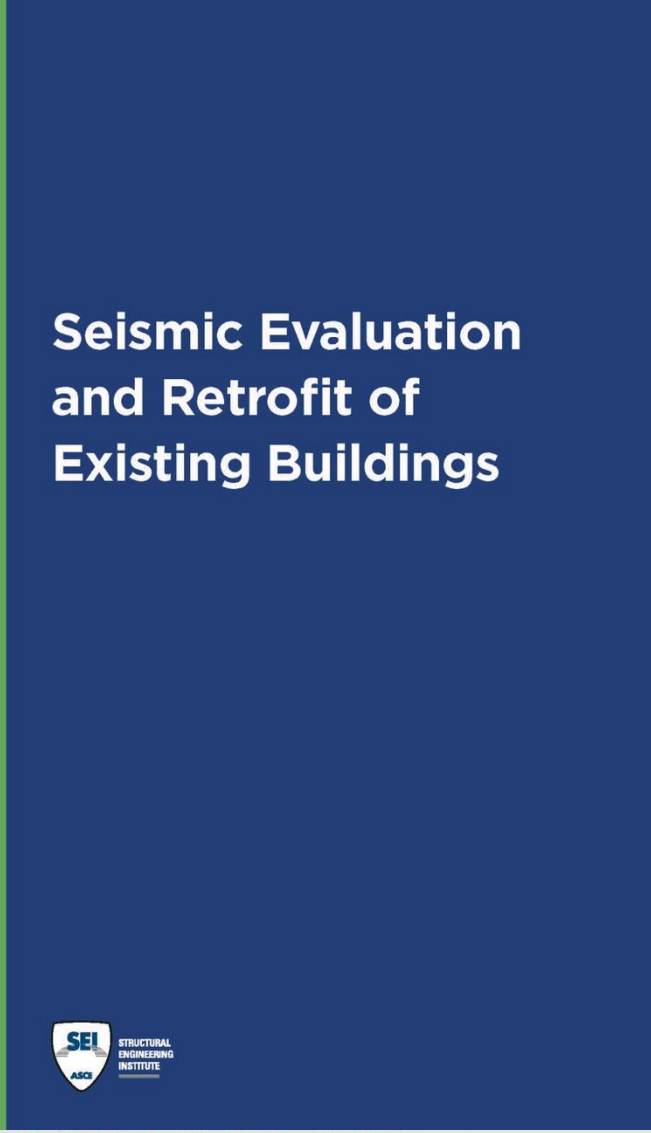
- Regional and international workshops
- Seminars for local architects and engineers.

EXISTING BUILDING CODES/RETROFIT









SCE 41 and FEMA P-2006

EXISTING BUILDING CODES/RETROFIT

	BPOE	
Risk Category	BSE-1E	BSE-2E
I & II *(Typical buildings)*	**Life Safety** Structural Performance **Life Safety** Nonstructural Performance	**Collapse Prevention** Structural Performance **Hazards Reduced** Nonstructural Performance
III *(Schools, Assembly)*	**Damage Control** Structural Performance **Position Retention** Nonstructural Performance	**Limited Safety** Structural Performance **Hazards Reduced** Nonstructural Performance
IV *(Essential facilities, i.e. hospitals & EOCs)*	**Immediate Occupancy** Structural Performance **Position Retention** Nonstructural Performance	**Life Safety** Structural Performance **Hazards Reduced** Nonstructural Performance

Table 2-2. Scope of Assessment Required for Tier 1 and Tier 2 with the Basic Performance Objective for Existing Buildings (BPOE)

Risk Category	Tier 1 and 2[a]	
	BSE-1E	BSE-2E
I and II	Not evaluated	Collapse Prevention Structural Performance
	Life Safety Nonstructural Performance (3-C)	Hazards Reduced Nonstructural Performance[b] (5-D)
III	Not evaluated	Limited Safety Structural Performance[c]
	Position Retention Nonstructural Performance (2-B)	Hazards Reduced Nonstructural Performance[b] (4-D)
IV	Immediate Occupancy Structural Performance	Life Safety Structural Performance[d]
	Position Retention Nonstructural Performance (1-B)	Hazards Reduced Nonstructural Performance[b] (3-D)

EXISTING BUILDING CODES/RETROFIT

Phase 1: Initial Assessment

- Adoption of basis for Retrofit Codes of Armenia
- IEBC - general retrofit; ASCE 41-23 – seismic retrofit; ACI 562 – concrete

Phase 2: Development of Localization Strategy

- Critical existing building groups and types
- Hazard maps; Performance Objectives; Material Standards

Phase 3: Pilot Implementation and Feedback

- Develop retrofit concepts for vulnerable building types
- Perform actual retrofit on several building types
- Get feedback from professional community

Phase 4: Institutionalization

- Adoption Retrofit Codes by Urban Development Committee
- Integration with Armenia’s national disaster risk reduction strategies

Phase 5: Monitoring, Evaluation, and Knowledge Sharing

- Workshops, seminars, and continuous education
- Conduct periodic reviews and updates to remain up to date

BUILDING PLAN CHECK

1. California Current Plan Check Process

- **Multidisciplinary review**: Plans are checked by architectural, structural, civil,
- electrical, mechanical, and fire safety experts.
- **Standardized submittals**: Applicants must provide detailed architectural and
- engineering drawings.
- **Iterative feedback**: Reviewers issue correction notices, and applicants revise and resubmit until approval.
- **Digital workflows**: Many cities use online portals for submission, tracking, and communication promoting paperless plan check process.

2. Armenia's Current Plan Check Process

- Architectural-Planning Assignment (APA)
- Submitting design documentation
- Passing the plan check at private firms licensed by UDC and receiving the construction permits
- Or undergoing additional state expertise for higher-risk categories and receiving construction permits.
- Since January 2025 electronic submittals are possible via urban.e-gov.am

BUILDING PLAN CHECK

3. Systems Bridging and Improvements

- **Introduce standardized checklists** for each risk category
- **Train municipal staff** in multidisciplinary review methods.
- **Implement phased review cycles** with formal correction notices and resubmittals.
- **Enhance more comprehensive digital tools** to allow real-time tracking, reviewer comments, and applicant responses.

4. Pilot Program

- Test the improvements in Yerevan or Gyumri or any other municipality.
- Adjust the plan check process in parallel with updates of Armenian codes and local construction norms.
- Translate documentation standards into Armenian and ensure compatibility with local design software.

5. Continuing Education

KEY CHALLENGES

- **Staffing and Workforce Capacity** – Addressing resource limitations and workload distribution.
- **Consistency in Enforcement and Training** – Ensuring uniform application of codes and ongoing staff development.
- **Conflict of Interest Management** – Establishing protocols to prevent and address potential conflicts.

INSPECTION AND CONSTRUCTION SUPERVISION

1. California's Current Process

- **Quality assurance inspections**
- **Code compliance** with California Building Code
- **Collaborative problem-solving** during construction
- **Detailed documentation** and reporting throughout the project lifecycle
- **Digital Workflow** integrated with Building Plan check Process

2. Armenia's Current Process

- Multiple Inspections Agencies
  - Yerevan Municipality's Architectural and Urban Development Department
  - State Inspection of Urban Development
  - Utility providers for technical approvals (water, gas, electricity, etc.)
- Outsourced to private agencies
- Final occupancy inspections and cadastre registration

INSPECTION AND CONSTRUCTION SUPERVISION

3. Bridging and Improvement Strategies

- **Centralization of inspection authority**
- **Clearly define third-party quality assurance inspector's** responsibilities.
- **Digitize documentation and reporting**
- **Develop a national training and certification program**
- **Pre-construction meetings** between inspectors, engineers, architects, and contractors to preempt design or compliance issues.

4. Pilot Program and Feedback

Start with a pilot program in Yerevan, Gyumri, Vanadzor, or any other locality:

- **New inspection protocols**
- **Digital permit tracking**
- **Inspector training modules**
- **Get feedback and tune the program for nationwide implementation**

5. Continuing Education

KEY CHALLENGES

1. **Regulatory and Bureaucratic Complexity**
2. **Training and Workforce Readiness**
3. **Cost and Economic Constraints**
4. **Technological Infrastructure**
5. **Cultural and Industry Resistance**
6. **Legal and Liability Framework**

LICENSING AND EDUCATION

1. Duties of Licensing Regulatory Body

- Should be **AUTONOMOUS** and operate based on UDC regulations.
- Licensing administration and renewal
- Oversight of continuing education
- Disciplinary actions and ethics enforcement

2. Licensing Structure

- **Stage 1: Engineer-in-Training or Associate Engineer**
  - Bachelor's degree + Basic Examination
- **Stage 2: Licensed Professional Engineer**
  - 4 years of supervised engineering practice + discipline-specific ***Professional Engineering*** exam
- **Disciplines:** Structural, Civil, Mechanical, Electrical, etc.
- **Licensing Validity:** 2-year cycle

LICENSING AND EDUCATION

3. Continuing Education Requirements

Develop National guidelines for continuing education for each category

- Engineers
- Inspectors
- Plan checkers

Licensing Board shall be involved in development of those guidelines

4. Pilot Program and Transition

- Consultation with engineers, universities, private sector
- 6-month pilot program with volunteer engineers
- Gradual mandatory implementation over 2 years

5. Legislative Support

- Define Licensing Board’s legal authority
- Make Continuing Education a mandatory professional standard
- Impose penalties for noncompliance or fraud

6. Heavy Involvement of Universities

- NUACA
- Polytechnic
- AUA
- Adjustments of university curriculums based on the collaboration advancement

RESOURCES

Direct Financing, Grants, Technical Assistance

- Armenian Government through budgetary allocations to
  - Urban Development Committee
  - Other related organizations
- Industry partners
- Private Sector
- International Partners Grant and Technical Assistance Possibilities Implementation
  - International Code Council (ICC) *Building Resilient Infrastructure and Communities* (BRIC) program
  - International Code Council (ICC) Resilient *and Efficient Codes Implementation* (RECE) initiative
  - American Concrete Institute (ACI) *NEU Center of Innovations*
  - American Society of Civil Engineers (ASCE) Structural Engineering Institute (SEI)
  - American Society of Civil Engineers (ASCE) Infrastructure Resilience Division
  - Earthquake Engineering Research Institute (EERI)
- UNESCO – *International Platform for Reducing Seismic Disaster* (IPRED)
- World Bank *Global Facility for Disaster Reduction and Recovery* (GFDRR)

NEXT STEPS

- Each ASOF SSTF – UDC working group identifies the priority tasks to be addressed
- For simple tasks develop proposals to UDC leadership for discussion and acceptance
- For more comprehensive tasks involve more professionals in that fields from Armenia, as well as abroad
- Secure coordination between all five working groups, since all those fields are highly interconnected.
- For larger tasks requiring financing and involvement of paid personnel, joint ASOF-UDC joint proposals may be prepared to the government, Industry partners, International related organizations.
- Quarterly coordination meetings, personal and Zoom.

THANK YOU FOR YOUR ATTENTION

JUNE 26-28, 2025

DILIJAN, ARMENIA

THE ARMENIAN SOCIETY OF FELLOWS

Ճանաչել զիմաստութիւն եւ զխրատ, իմանալ զբանս հանճարոյ