Country report: The Republic of Moldova

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Affiliation: European neighboring countries of Eastern Europe
The Republic of Moldova

- located in Eastern Europe, bordered on the west and southwest by Romania and on the north, south, and east by Ukraine
- population - 4,038,575 people, density of population - 123 per km², the total land area - 32,850 Km²
- main cities are the capital Chisinau, in the center of the country, Tiraspol (in the eastern region of Transnistria), Bălți (in the north) and Bender (in the south-east)
- the climate is moderately continental, its proximity to the Black Sea leads to the climate being mildly cold in the autumn and winter and relatively cool in the spring and summer
The Republic of Moldova

✓ average elevation of around 147 m above the sea level
✓ maximum altitude of 429.5 m
✓ north with maximum altitude of 320 m
✓ south with maximum altitude of 250 m
✓ average summer temperature : 25 ÷ 32°C
✓ rainfall: 620 mm in the north to 490 mm in the south
Legal/policy framework for adoption of the Eurocodes

✓ Law # 112/2014 (ratification of the Association Agreement Moldova – UE, art. 173 (5):
  - progressively transposition of the corpus of European Standards (EN) as national standards
  - simultaneously with such transposition, withdraw conflicting national standards

✓ Gov. Decision # 933/2014 Action plan for Gov. 2014-2020 (implementation of Eurocodes), art. 3:
  - harmonization of national normative documents in the field of construction with European standards
  - withdrawal of conflicting national standard identical with European standards
Institutional framework

- Ministry of Economy and Infrastructure (technical regulation of construction)
- INCERCOM – State Scientific and Research Institute in Construction (development of technical regulations, technical agreements, testing, certification of construction products, research)
- URBANPROIECT – State Design and Research Institute (development of technical regulations, design of constructions, development of city plans)
- Institute of Geography and Ecology – climate maps
- Institute of Geology and Seismology – seismic maps
- Institute for Standardization of Moldova (development and adoption of standards)
ISM – National Standards Body (NSB) of Moldova

- public institution founded by the Ministry of Economy and Infrastructure
- development and adoption of standards
- 29 staff
  11 staff Standardization Department
- 25 National Technical Committees (NTC)
  3 NTC in construction field (TC 49 Energy efficiency of buildings, TC 51 Construction materials and articles, TC 54 Eurocodes)
TC 54 Eurocodes

- established in 2016
- 9 TC members
- development of the national annexes to Eurocodes

Research and design 33%

Academia 34%

Authorities 22%

Producers 11%
## Technical regulations and standards in construction ≡ Eurocodes

<table>
<thead>
<tr>
<th>Eurocod</th>
<th>Title Eurocod</th>
<th>Analogical Moldovan norm</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>EN 1991</td>
<td>Actions on structures</td>
<td>SNiP 2.01.07-85*</td>
<td>Loads and actions</td>
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<tr>
<td>EN 1993</td>
<td>Design of steel structures</td>
<td>SNiP II-23-81*</td>
<td>Steel structures</td>
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<tr>
<td>EN 1994</td>
<td>Design of composite steel and concrete structures</td>
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<tr>
<td>EN 1995</td>
<td>Design of timber structures</td>
<td>NCM F.05.01-2007</td>
<td>Wood structures. Designing timber constructions</td>
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<tr>
<td>EN 1996</td>
<td>Design of masonry structures</td>
<td>NCM F.03.02-2005</td>
<td>Masonry structures. Design of buildings with masonry walls</td>
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<tr>
<td>EN 1997</td>
<td>Geotechnical design</td>
<td>SNiP 2.02.01-83*, SNiP 2.02.03-85</td>
<td>Bases of structures. Pile foundations</td>
</tr>
<tr>
<td>EN 1998</td>
<td>Design of structures for earthquake resistance</td>
<td>SNiP II-7-81*</td>
<td>Construction in Seismic Areas</td>
</tr>
<tr>
<td>EN 1999</td>
<td>Design of aluminium structures</td>
<td>SNiP 2.03.06-85</td>
<td>Aluminium structures</td>
</tr>
</tbody>
</table>
Eurocodes adoption

10 standards (EN 1990 – 1999)
58 Eurocodes parts adopted (2010-2011) as national

| SM EN 1990 | Eurocode 0: Basis of structural design |
| SM EN 1991 | Eurocode 1: Actions on structures     |
| SM EN 1992 | Eurocode 2: Design of concrete structures |
| SM EN 1993 | Eurocode 3: Design of steel structures |
| SM EN 1994 | Eurocode 4: Design of composite steel and concrete structures |
| SM EN 1995 | Eurocode 5: Design of timber structures |
| SM EN 1996 | Eurocode 6: Design of masonry structures |
| SM EN 1997 | Eurocode 7: Geotechnical design       |
| SM EN 1998 | Eurocode 8: Design of structures for earthquake resistance |
| SM EN 1999 | Eurocode 9: Design of aluminum structures |

Countries that have adopted or expressed interest in the Eurocodes

EU-EFTA countries

“The way forward for the Eurocodes implementation in the Balkans”, 10-11 October 2018, Tirana
Eurocodes translation

✓ 100 % of Eurocodes translated in Romanian language

✓ ISM received Romanian translations of all Eurocodes from the Romanian Standards Association (signed Agreement with ASRO)
DEVELOPING NATIONAL ANNEXES

- 15 National Annexes for Eurocode 0, 1, 2 developed and published
- NDPs defined for Eurocode 3, 4, 5
National Annexes and harmonization

<table>
<thead>
<tr>
<th>Year</th>
<th>NA developed and published</th>
<th>NDPs defined</th>
<th>not developed yet</th>
</tr>
</thead>
<tbody>
<tr>
<td>SM EN 1990</td>
<td>NA developed and published</td>
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"The way forward for the Eurocodes implementation in the Balkans", 10-11 October 2018, Tirana
Air temperature maximum (in shadow)-50 years

Isothermal map of the Republic of Moldova for the characteristic values of the maximum annual temperatures

Isothermal map of the Republic of Moldova for the characteristic values of the maximum annual temperatures

“The way forward for the Eurocodes implementation in the Balkans”, 10-11 October 2018, Tirana
Air temperature minimum (in shadow)-50 years

Isothermal map of the Republic of Moldova for the characteristic values of the minimum annual temperatures
Snow loads map

Zoning of Moldova’s territory in terms of characteristic values of snow loads on the ground, $S_k$, kN/m², 50 years

<table>
<thead>
<tr>
<th>Zona</th>
<th>Încărcarea caracteristica $S_k$, kN/m²</th>
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</thead>
<tbody>
<tr>
<td>1</td>
<td>1,0</td>
</tr>
<tr>
<td>2</td>
<td>1,5</td>
</tr>
<tr>
<td>3</td>
<td>2,0</td>
</tr>
</tbody>
</table>

“The way forward for the Eurocodes implementation in the Balkans”, 10-11 October 2018, Tirana
Wind map

Zoning of Moldova’s territory in terms of reference values of dynamic wind pressure, $q_b$, in kPa, 50 years
Seismic zones – 6, 7, 8 grades

a) in terms of MSK

b) in terms of Eurocode 8
SEISMIC ZONE VRANCEA, Romania

- The earthquakes reach a depth of about 180 km
- Maximal magnitude achieves 7.5-7.8 (max) on Richter’s scale
- The maximal seismic intensity is evaluated at the level of 8-9 degrees according to the 12-degree scale
EUROCODES IMPLEMENTATION. FUTURE...

Eurocode 6: Design of masonry structures
Eurocode 7: Geotechnical design
Eurocode 8: Design of structures for earthquake resistance
Eurocode 9: Design of aluminum structures
Eurocodes implementation. Challenges

• Insufficient capacities (specialists, financial, technical)

• Inadequate legislative framework for EN standards implementation (SNiP, NCM ≡ Eurocode, SNiP and NCM – mandatory, prescriptive; EN standards – voluntary, mainly performance based)

• Resistance from professionals (high degree of conservatism)
Thank you for your attention!

Useful links:

Ministry of Economy and Infrastructure (www.mei.gov.md)

Institute for Standardization of Moldova (www.standard.md)