The Project for Promotion of Nepal National Building Code Compliance for Safer Building Construction (NBCC)

Newsletter Volume-6, November 2024

[Project Introduction]

In Nepal, there are National Building Code (NBC) and Building By-Laws (BBL). If you build a house in compliance with them, the house will be earthquake-resistant. When you build a house, you have to submit drawings and other necessary documents to the municipality and get a building permit. The municipality carefully checks whether the drawings comply with the NBC and BBL or not. Therefore, if you build a house according to the approved drawings, your house meets the NBC and BBL which makes an earthquake-resistant house.

However, we can see houses are constructed without following the approved drawings while some building owners build their houses without getting a building permit from the municipality. Buildings that are not constructed as per the approved design & drawings can be more damaged during an earthquake and may endanger the neighbors' houses.

To improve this situation, the Ministry of Urban Development (MoUD) started the NBCC Project with the support of JICA (Organization of the Japanese government). The NBCC Project aims to increase the construction of earthquake-resistant houses by improving the procedure for applying for construction permits to municipalities.

[Contents of the Newsletter Vol. 6]

[1. Overview of e-BPS]

In Nepal, the recent practice of building permit applications is manual i.e. paper based. However, some municipalities have started using an electronic system called e-BPS.

1-1 Benefits of Implementing e-BPS

The main aim of implementing e-BPS is shifting from a traditional paper-based system to an electronic system whose benefits are as follows:

(a) Improving Work Efficiency through Data Digitization

(i) Online Registration:

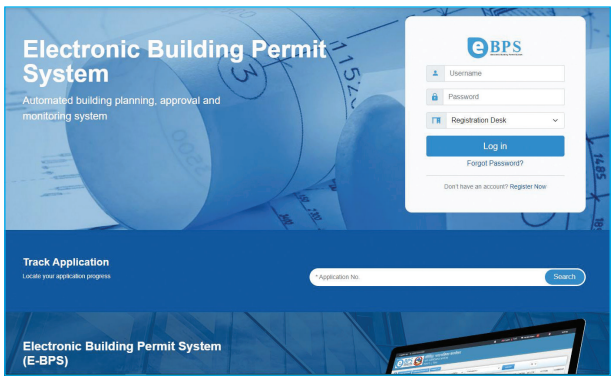
Applicants can register and submit building permit applications online through the municipality's web portal. This method is faster and reduces the manual hours municipal staff spend on data entry. Necessary information, such as details about NBC and BBL, checklists, and designer/supervision consultants/contractor information, is available online.

(ii) Tracking Permit Status:

The system updates permit status in real time, allowing applicants to track their applications online, reducing the need for phone calls or office visits.

(iii) Compliance Checking:

e-BPS automates the process of checking compliance with NBC and BBL, speeding up permit processing and identifying non-compliant buildings.



Website of e-BPS

(iv) Submission and Review of Design CAD Data:

The system supports digital submission and review of design CAD data, enhancing efficiency and accuracy. It improves communication, reduces paper use, and integrates with municipal systems for better transparency and collaboration.

(v) Preparation and Submission of On-Site Inspection Reports:

Digitizing inspection reports ensures systematic documentation and real-time tracking of compliance with building codes, improving accuracy and coordination among stakeholders.

(vi) Printing of Standard Documents:

e-BPS automates the issuance of permit certificates, reducing manual processing and ensuring consistency across municipalities.

(vii) Digitization of Past Documents:

Old paper permits are converted to digital formats, creating searchable indexes for quick access to information and improving post-review accuracy.

Group photo during orientation for building owner at Dakshinkali Municipality

(b) optimizing work processes and increasing added value

- by preventing fraud and ensuring fair reviews

(i) Comment History Tracking:

This module records interactions between municipality and designers/consultants, providing a transparent history of feedback and queries.

(ii) Audit Trails:

Records all actions and modifications related to reviews and inspections, enhancing accountability and transparency.

(iii) Compliance Monitoring by Department of Urban Development and Building Construction (DUDBC):

Tracks and evaluates municipalities' compliance to NBC and BBL to maintain better construction standards.

Group discussion during training for Supervision Consultant and Designer at Tarakeshwor Municipality

- By enhancing services for citizen

(i) Performance Evaluation:

Records and publicly discloses performance grades of contractors and supervision consultants to promote improved service quality and help building owners select reliable professionals. This helps contractors and supervision consultants to improve the quality of service.

(ii) Revenue Integration:

Links with accounting systems to streamline revenue operations and ensure accurate financial records, reducing manual data entry and enhancing coordination between departments.

(iii) Visualization of Building Locations:

Provides map-based interfaces to facilitate inspections by displaying building locations and relevant data.

(iv) Dual GPS Acquisition:

Captures GPS coordinates before and during construction for precise building location data.

1-2 Building Construction Working Procedure (BCWP) and e-BPS Implementation Status

The implementation status of BCWP and e-BPS in pilot municipalities are as follows.

Table 1- Implementation Status of BCWP and e-BPS

S.N.	Municipality Name	Process of Admitting BCWP	BCWP Approval Date	e-BPS Application Date
1.	Tokha Municipality	Municipal Executive Committee	11 May, 2023	31 July, 2023
2.	Dakshinkali Municipality	Municipal Executive Committee	12 January, 2023	5 May, 2023
3.	Bagmati Rural Municipality	Rural Municipal Executive Committee	29 September, 2022	-
4.	Tarakeshwor Municipality	Municipal Executive Committee	27 April, 2023	-
5.	Mahalaxmi Municipality	Municipal Executive Committee	22 September, 2024	-

Note: Lalitpur Metropolitan City & Suryabinayak Municipality are in the process to implement BCWP

Five days training for Municipal technical persons of municipalities of Bagmati Province at Provincial Center for Good Goverance (PCGG), Lalitpur

Two days training for Supervision Consultant and Designer at Tokha Municipality

1-3 Server Arrangement

The e-BPS is hosted in government data centers managed by the Department of Information Technology (DoIT) or the National Information Technology Center (NITC), providing municipalities with free access to the necessary server resources. This eliminates the extra investment of municipalities in servers, making the system more affordable and accessible, especially for smaller municipalities. However, they are still required to purchase a Windows operating system license since e-BPS operates on Windows.

1-4 e-BPS Training

NBCC Project is conducting training for municipal technical persons, Designers, Supervision consultants and others to make them clear on the utilization of e-BPS.

Table 2- Training Details

S.N.	Training Description	Training Date	Number of Participants	Venue	Participants
1	Two days e-BPS session conducted during 5-days Master TOT event	1st & 2nd December 2022	25	DUDBC	Engineers of Pilot Municipalities, DUDBC, MOUD & Kathmandu Valley Development Authority (KVDA)
		15th & 16th December 2022	24		
		5th & 6th January 2023	22		
		2nd & 3rd March 2023	24		
2	Additional Training on e-BPS	7th & 26th December 2023	7	DUDBC	Authorized/ Focal Engineers of e-BPS in Pilot Municipalities
3	BCWP & e-BPS training	28th June 2023	7	Tokha Municipality	Municipal technical persons
		29th & 30th August 2023	19	Tokha Municipality	Designers and Supervision Consultant
		8th– 10th October 2023	26	Dakshinkali Municipality	Municipal technical persons, Ward Secretaries, Designers and Supervision Consultant
		28th & 29th February 2024	20	Tarakeshwor Municipality	Municipal technical persons
		13th & 14th May 2024	21	Tarakeshwor Municipality	Designers and Supervision Consultant
		27th & 28th August, 2024	51	Mahalaxmi Municipality	
4	One day e-BPS session conducted during 5 days TOT event	19th April 2024	95	PCGG	Municipal technical persons of Bagmati Province
		26th April 2024			
		30th April 2024			
5	One day workshop on Building Permit Process and e-BPS	1st June 2024	23	Dhangadhi	Municipal technical persons of Sudurpaschim Province

[2. Overview of BIM]

2-1 About BIM

Building Information Modelling, commonly abbreviated as BIM, is a digital representation of a building combined with its properties. In other words, it is a process of combining different models in single 3D model with a database that contains various parameters (for example, wall thickness, number of bricks, grade of concrete, diameter & number of rebar, rebar pitch, and all other data necessary for construction) at different stage from design to construction also during maintenance stage. Several software programs have been developed to realize BIM such as Archicad.

All necessary drawings (plans, elevations, sections), Bill of Quantity (BOQ), perspective, etc. can be prepared from information in the database, so it improves the consistency among drawings.

With current methods, plans, elevations, sections, etc., are prepared separately. Therefore, if any modifications are required, these drawings must be updated individually, and their consistency needs to be checked manually.

By utilizing BIM, municipal engineers, designers, contractors, and supervision consultants can share information easily and be on the same platform and carry out their work more efficiently.

Typically, ensuring that a building meets all the required codes using the manual process takes a lot of time and effort. By adopting BIM, this process can be significantly streamlined. As described above, all data is coming from the database, so the NBC compliance checking will be faster, smoother and easier with the BIM process

2-2 BIM Workshop

The DUDBC recognizes the potential of BIM to digitize and modernize the traditional workflow of building permits and compliance systems present in Nepal and therefore conducted a 1-day workshop about BIM on 19th July 2024. In Nepal, BIM is being used in some government and private sector projects. Few of the notable government projects where BIM was utilized are Butwal international convention center, Koshi Hospital, Lumbini Provincial Hospital etc.

Participants discussing how to utilize NBC Architectural and Structural Compliance Checklist in BIM models.

(a) Target and focus of the workshop

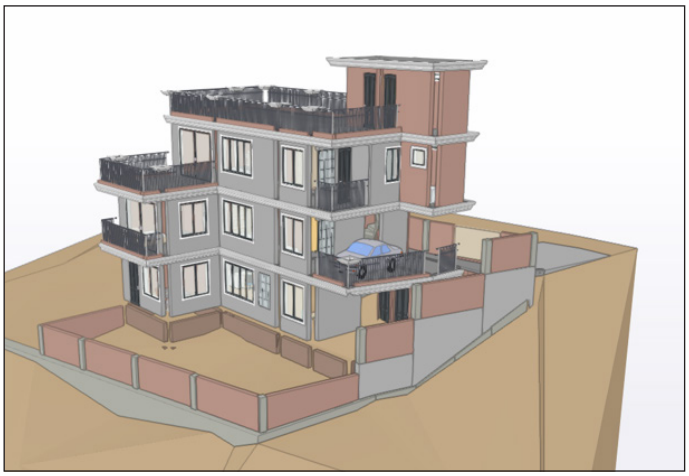
The workshop was targeted mainly for DUDBC and Municipal engineers of pilot municipalities. Altogether 32 participants attended the workshop. The focus of the workshop was to conceptualize and brainstorm to make use of BIM for National building code compliance and permit systems. The Deputy

Director General Mr. Prakirna Tuladhar welcomed the program, emphasizing that BIM technology widely used in the USA, Japan and Europe is new to Nepal. He believes that the brainstorming program is a significant help in developing the action plan. The senior representative of JICA Nepal Ms. Tomoko Tanaka, also thanked the NBCC project for organizing the workshop. Nepal BIM Forum (NBIMF) chairperson Ar. Sankalp Pokhrel stressed BIM'S importance for building code compliance. The event was also featured in a "Purbadhar Paribesh" program which was aired on Nepal Television. This coverage helped to raise awareness about the importance of integrating BIM into building code compliance. To watch the program, follow the link **https://www.youtube.com/watch?v=ls0-cnFz-VY** and scan the QR code.

(b) Contents of the workshop

During the workshop, participants were split into four groups to check whether the buildings met the NBC requirements or not. Two different BIM models of buildings were used to review both the architectural and structural aspects.

- For the architectural review (NBC 206:2024), right of way (ROW), light and ventilation, staircase needs, and the width and path of exits were checked.
- For the structural review (NBC 105:2020), the focus was on the height of the ground floor, the typical height of the building and its floors, and the sizes of columns and beams.



Model 1

Model 2

(c) Discussions

After the group work, each group shared their findings and explained how the BIM process helps ensure buildings meet the NBC requirements. They highlighted several benefits which are listed below:

- Reduce paperwork and enable all the stakeholders to work together in the same platform.
- Save time on checking NBC checklist through Automated BIM scripts
- Disaster resistant buildings can be promoted by improving compliance verification.
- Communication and collaboration will be easier between stakeholders.
- Augmented reality can be used for the onsite inspection

Similarly, the participants also highlighted various challenges to implement the BIM based building compliance and permit system

- Different municipalities have complex and varying BBL leading to the non-uniform BIM script.
- Lack of government policy regarding the BIM uses and it's implementation within the BCWP.
- Lack of technical skills among engineers for producing BIM models.
- Lack of awareness among the municipal political leaders.
- Lack of academic courses about BIM in educational institutions.

After the discussion among participants, the workshop highlighted the important role that DUDBC needs to play to further develop this initiative and recommended the formation of a BIM Task Force to conduct various activities:

- Define requirements to verify the revisions among Architectural and Structural drawings.
- Revise BCWP to accept BIM at the time of building permit application.
- Enhance e-BPS to save BIM in its database.
- Deliver general BIM training courses to disseminate BIM.
- Ready-made BIM elements (Column section, BIM section) should be made according to the NBC, which will make compliance checks simple and effective in the building permit system.
- Development of academic courses and training related to BIM in academic institutions.

Group photo during one day workshop on BIM

The NBCC project prepared a document and handed it over to the DUDBC for further planning.

〖 3. Recent Project Events 〗

- A one-day workshop on Building Information Modeling (BIM) was held in Kathmandu on 19th July 2024.
- A one-day orientation on the updated BCWP for building owners was held in Tokha Municipality on 1st July 2024.
- A one-day orientation on the updated BCWP for building owners was held in Dakshinkali Municipality on 6th August 2024.
- The endline survey, awareness survey, and capacity assessment have been started from mid of August 2024.
- Two days workshop on e-BPS, roles and responsibilities of designer and supervision consultant as per updated BCWP were conducted at Mahalaxmi municipality from 27th of August to 28th of August, 2024
- Presentation on steel structure design and its guidelines was held in DUDBC, Kathmandu on 25 September 2024.

Technical Support from NBCC project.

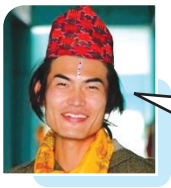
- Three events of five-day training on NBC, e-BPS and updated BCWP for municipal technical person of Bagmati Province were conducted at PCGG, Lalitpur with technical support from DUDBC and NBCC.
- A one-day orientation on BCWP and e-BPS for municipal technical person of Sudurpaschim Province were conducted in 1st June 2024 at Dhangadhi organised by United Nation Development Programme (UNDP) with technical support from DUDBC and NBCC.
- The UNDP has officially handed over the source code of the e-BPS system to DUDBC.

〖 4. Introduction of the Project Members 〗

In this newsletter, we introduce some members and staff of the project. Other members and staff will be introduced in the next volumes.

Hajime Mayama (Japanese expert)

He is responsible for training on design and supervision.



I have many friends in Nepal. I hope this project will enhance their safety.

I love traveling in the mountains of Nepal for the beautiful views and adventure.

Mahesh Karki (BIM expert)

He is responsible for implementing BIM training. He has experience of using BIM in both international and Nepalese projects and has worked as a BIM Manager on several of them.

Please visit the Project Website
You can access to the page after the registration.
https://sites.google.com/view/nbctraining/home

Registration *Website* *BCWP Video*

Implemented by Ministry of Urban Development
Department of Urban Development and Building Construction
Technical cooperation Japan International Cooperation Agency
https://dudbc.gov.np/en/detail/domain-menu/1973?parent=1862