



**NATIONAL OCCUPATIONAL STANDARD**

**PRECAST CONCRETE PRESTRESSER  
LEVEL 3**

**REFERENCE CODE / 12UMS0249-3**

**OFFICIAL GAZETTE DATE - NUMBER / 15.09.2012 – 28412 (Duplicated)**

<b>Occupation:</b>	<b>PRECAST CONCRETE PRESTRESSER</b>
<b>Level:</b>	<b>3<sup>1</sup></b>
<b>Reference Code:</b>	<b>12UMS0249-3</b>
<b>Prepared by:</b>	<b>The Turkish Employers Association of Construction Industries (INTES)</b>
<b>Verified by:</b>	<b>VQA Construction Sector Committee</b>
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<sup>1</sup> Occupational Qualification Level is determined as Level Three (3) in the octal (8) level matrix.

### TERMS, SYMBOLS AND ABBREVIATIONS

**PIPING (ENCASING):** The process of placing special pipes around the prestressing cable, in prestressed concrete components, during transfer of the tensile force to the concrete, in order to prevent the adherence in sections determined as a result of calculation and which the prestressing is not necessitated to be transferred to the concrete.

**REINFORCEMENT:** The bonded status according to the project of the concrete reinforcing steel,

**FITTINGS:** Connection element of the prestressing cable in order to prevent outage,

**ISCO:** International Standard Classification of Occupations,

**OHS:** Occupational Health & Safety,

**FORMWORK LUBRICATION:** The application to prevent adhesion of the fresh concrete before pouring into the formwork,

**COUPLING:** The element transferring the stressing process to the strand and preventing it to wince,

**EDGE STRAND:** The edge section of prestressing strand located in the prestressed prefabricated element section,

**PERSONAL PROTECTIVE EQUIPMENT (PPE):** All kinds of tools, instruments, appliances and devices which are worn, put on or hold by the worker and which protect the worker from one or more hazards arising from the work and effect the health and safety of the worker, and which are designed to suit such purpose,

**SUPPORTING:** Means fixing of prefabricated components on the stock area and during the installation at the described distance,

**PRESTRESSING:** The internal stress, which occurs through the adherence and transfer of components between the reinforced bars and the concrete after hardening of the concrete, applied before pouring the concrete to the high quality reinforced bars, placed into the concrete,

**PRESTRESSING STRAND:** High steel used in the production of prestressed concrete elements,

**RISK:** Probability of occurrence of a hazardous event and combination of results.

**FRESH CONCRETE:** The state of shaping of a newly mixed concrete before hardening,

**DANGER:** Potential of damage or injury likely to affect the worker or work place and likely to exist in the workplace or to be caused externally,

**WIRE ELONGATION:** The extension on the strands during prestressing process,

**PRODUCTION HALL (INTERNAL HALL):** The place of production.

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## **1. INTRODUCTION**

National occupational standard titled Precast Concrete Prestresser (Level 3) was issued by the Turkish Employers Association of Construction Industries (İNTES) assigned as per the provisions of Vocational Qualifications Authority (VQA) Law No. 5544 and “Bylaw on Drawing up National Occupational Standards” and “Regulation on the Establishment, Duties and Operation Procedures and Principles of the Sector Committees of Vocational Qualification Authority” introduced pursuant to the aforementioned Law.

National occupational standard titled Precast Concrete Prestresser (Level 3) was assessed upon receiving the opinions of the related institutions and organizations in the sector, and approved by VQA Board of Directors upon examination of the VQA Construction Sector Committee.

## **2. INTRODUCTION OF THE OCCUPATION**

### **2.1. Definition of the Occupation**

Precast Concrete Prestresser (Level 3) is the qualified person who makes the work organization related to his occupation, carries out the preparation processes of precast elements before prestressing and the post prestressing processes by taking environmental measures related to the Occupational Health and Safety and within the scope of quality systems.

### **2.2. Place of the Occupation in International Classification System**

ISCO 08: 7114 (Concrete placers, concrete finishers and related workers)

### **2.3. Regulations on Health, Safety and Environment**

Labor Law No. 4857

Social Security and General Health Insurance Law No.5510

Occupational Health and Safety Law No. 6331

Regulation on Heavy and Dangerous Works Regulation on Safety and Health Signs

By Law on the Health and Safety Conditions when using Business Equipment

Occupational Safety and Health Regulation

By Law on the Usage of Personal Protective Equipment in the Business Places

By Law on Occupational Health and Safety in Construction Works

By Law on Health and Safety in Construction Works

Regulation on Control of Hazardous Wastes Furthermore, it is essential to obey laws, statutory rules and regulations on occupational health and safety and environment; and to perform risk analysis regarding this issue.

### **2.4. Other legislation relating to the occupation**

TS 3233 Calculation and Construction Rules For Prestressed Concrete Structures

TS EN 13369 Precast Concrete Products – General Rules

Other Legislation Regarding The Occupation Public Servants Law No. 657

### **2.5. Working Environment and Conditions**

The working environment of the Precast Concrete Prestresser (Level 3) is generally dangerous, noisy, dusty, rather dirty, requiring well ventilation. There are risks of accident and getting injured during performance of works and these require being taken of measures regarding occupational health and security.

### **2.6. Other Requirements Regarding The Occupation**

The Precast Concrete Prestresser (Level 3) must have a "Form of Initial Entrance and Periodical Medical Examination for Workers in Heavy and Dangerous Works" report.

### 3. OCCUPATIONAL PROFILE

#### 3.1. Duties, Tasks and Performance Criteria

Duties		Tasks		Performance Criteria	
Code	Name	Code	Name	Code	Description
A	Doing work organization (continues)	A.1	To take measures towards occupational health and safety	A.1.1	Has knowledge about risk factors in the work environment
				A.1.2	Uses necessary PPEs for occupational health and safety
				A.1.3	Informs the authorized person regarding the troubles, which could constitute problems
				A.1.4	Avoids behaviours to cause accident; takes care of and follows the measures taken on the Occupational Health and Safety.
				A.1.5	Ensures that only related persons are present at the worksite
				A.1.6	Keeps ready first aid kit and fire extinguisher
				A.1.7	Takes with the communication devices (wireless, telephone etc.)
				A.1.8	Does the necessary safety equipment control at the workplace according to the instructions of the work safety expert.
				A.1.9	Ensures keeping the work areas clean and tidy.
				A.1.10	Takes necessary measures against the danger of fire
				A.1.11	Provides keeping the dangerous materials at a safe place
				A.1.12	Appropriates materials of occupational health and safety and keeps in closed areas.
		A.2	To take information regarding the work to be done	A.2.1	Takes information written or verbally from the related authorities regarding the work to be performed.
				A.2.2	Determines the program regarding the work
A.2.3	Reports the daily works to the superiors				

Duties		Tasks		Performance Criteria	
Code	Name	Code	Name	Code	Description
A	Doing work organization	A.3	To contribute decreasing of environmental risks	A.3.1	Does the necessary separation and classification for recycling of recyclable materials
				A.3.2	Separates the hazardous and harmful wastes from the other materials in accordance with the instructions and ensures that they're temporarily stored by taking the required measures.
		A.4	To apply technical procedures to ensure quality	A.4.1	Applies technical procedures to ensure quality according to the type of work
				A.4.2	Provides fulfillment of quality conditions during procedures.



Duties		Tasks		Performance Criteria	
Code	Name	Code	Name	Code	Description
<b>B</b>	Carrying out preparation processes before prestressing	<b>B.1</b>	To control missing materials	<b>B.1.1</b>	Controls the deficiencies in the stocks of prestressing strands and auxiliary production materials.
				<b>B.1.2</b>	Informs the authority for creating purchase request related to the missing materials.
		<b>B.2</b>	To make the required controls before prestressing process starts	<b>B.2.1</b>	Inspects the prestressing strands.
				<b>B.2.2</b>	Controls whether the prestressing strands and auxiliary materials are delivered in proper quantity or not.
		<b>B.3</b>	To ensure that the materials are cleaned	<b>B.3.1</b>	Cleans the prestressing strands and auxiliary materials to be used in the production in cooperation with the team and in accordance with their instructions.

Duties		Tasks		Performance Criteria	
Code	Name	Code	Name	Code	Description
C	Carrying out prestressing process	C.1	To make the controls required for prestressing process	C.1.1	If there is piping (encasing) in the project, controls the placement and lengths.
				C.1.2	Finds out the strength of taking out of the prestressed components from the formwork and ensures cutting of prestressing wires
		C.2	To take the measures required for prestressing process	C.2.1	Activates the audio and/or light warning signal systems for prestressing process.
				C.2.2	Ensures that the people working around him moves away from the area and the process is completed safely.
		C.3	To carry out prestressing process	C.3.1	Starts the prestressing process after the prestressing strands are built in and couplings are attached.
				C.3.2	Adjusts the prestressing machines to meet the design value according to the force pressure diagram when the prestressing jack is empty.
				C.3.3	Takes up clearances of prestressing strands as per the design value.
				C.3.4	Pulls the strands with the required force as per the design value.
				C.3.5	Uses the protective fixture for safety in case the exposed prestressing strand is long.
		C.3.6	Control and records each wire extension in the prestressed elements.		

Duties		Tasks		Performance Criteria	
Code	Name	Code	Name	Code	Description
D	To carry out post prestressing processes	D.1	To ensure that the prestressing strands are unloaded	D.1.1	Learns the shuttering removal strengths of prestressed elements from the relevant department and ensures that the prestressing strands are unloaded.
				D.1.2	Starts unloading from the unshielded and edge strands by crossing and completes the process.
		D.2	To control that prestressing strands are cut off	D.2.1	Cuts off all prestressing strands with his team controlledly.
				D.2.2	Informs the line contact in cases of emergency like strand breaking, stripping and ensures that the process is stopped.
		D.3	To record and report after prestressing	D.3.1	Fills in the Form of Prestressing Follow Up Chart and submits it to authority after prestressing is carried out.

Duties		Tasks		Performance Criteria	
Code	Name	Code	Name	Code	Description
E	Taking part in the occupational development activities	E.1	Performing studies on personal occupational development.	E.1.1	Participates in the trainings related to his occupation and keeps the certificates he obtains.
				E.1.2	Follows up new technologies and developments related to his occupation.
				E.1.3	Shares his/her knowledge and experience with his/her colleagues.

### 3.2. Tools, Appliances and Equipment Used

1. Intermediate Coupling
2. Coupling Gear Cleaner
3. Hammer
4. Immediate Family
5. Ashlar Stone Engine
6. Personal protective equipment (helmet, protective glove, ear protectors, steel toe shoes, luminous vest, safety belt, dust glasses, dust mask, protective clothes and etc.)
7. Barrel
8. Locker
9. Prestressing Machine
10. Chalk
11. Warning Devices
12. Oily Crayon
13. Fire Extinguisher

### 3.3. Knowledge & Skills

1. Knowledge on emergency case
2. Knowledge on tools, apparatus and equipment
3. Basic first aid knowledge
4. Knowledge on concrete
5. Ability of working in a team or an organization
6. Knowledge on Occupational Health and Safety Precautions
7. Knowledge on railway signs
8. Knowledge on the work site operation procedures
9. Knowledge on use of user's guide, handbook and maintenance book
10. Skill of estimating distance and weight
11. Knowledge on legal regulations regarding the occupation
12. Knowledge of vocational terms
13. Organization and organizational skill
14. Skill of learning and being able to share what he learned
15. Knowledge on prestressing material
16. Knowledge on design reading
17. Skills of oral and written communication
18. Knowledge on standard materials
19. Knowledge on statics-mechanics
20. Knowledge on basic legislation
21. Knowledge on fire fighting techniques and use of fire-extinguisher

### 3.4. Attitudes and Behaviours

1. To be cold blooded and calm under emergency and stressful situation
2. To decide within the scope of his knowledge and experience
3. To use her/his time effectively and efficiently in accordance with work orders
4. To adopt regulations set forth in environmental, quality, and OHS legislation
5. To be open to change and to adapt to changing conditions
6. To be in harmony with the team
7. To take care of human relations
8. To have working discipline
9. To obey the working principles of the workplace
10. To pay attention to the usage of tools, appliances and equipments belonging to workplace
11. To pay attention to quality
12. To be willingful to improve himself/herself
13. To ensure his/her own safety and safety of other people
14. To have professional ethics
15. To be planned and organized
16. To be sensitive to issues of risk and hazard factors
17. To know his/her responsibilities and to fulfill the same
18. To learn instructions and guides and to comply them meticulously
19. To react effectively, rapidly and correctly within his area of work in cases of emergency
20. Taking care of cleanness, tidiness, and order of workplace
21. To share information effectively, openly and accurately in shift changes
22. To inform authorities properly and on time
23. To inform concerned people about the defects which are not under his/her authority

#### **4. TESTING, ASSESSMENT AND CERTIFICATION**

Testing and assessment for certification with respect to national qualifications based on Precast Concrete Prestresser (Level 3) Occupational Standard shall be held in written and/or oral forms, theoretically and practically, in testing and assessment centers where required conditions are met.

Testing and assessment method and practice principles shall be detailed with national qualifications to be drawn up pursuant to this occupational standard. Activities regarding testing, assessment and certification shall be conducted within the framework of Vocational Qualification Authority, Testing and Certification Regulation.

## **ANNEX: Institutions Participated In the Occupational Standard Preparation Process**

### **1. Professional Standards Team of Institution Preparing Professional Standard**

H.Necati ERSOY	İNTES – Secretary General
Dr. Aytekin AKAGÜN	İNTES – Civil Engineer MSC
Aslı KARATEKİN	İNTES – Project Manager
Sevil Buket ATAR	İNTES – Construction Technician

### **2. Technical Work Group Members**

Alper Uçar	Turkish Prefabrication Union – Civil Engineer
Dolunay Çapan	Afaprefabrik A.Ş. – Civil Engineer
İlker Sezan	Kam Ankara Beton San. Inc. – Civil Engineer
Kenan Çelik	Kam Ankara Beton San. Inc. –Physics Engineer
Orhan Manzak	Yapı Merkezi Prefabrikasyon A.Ş. – Senior Civil Engineer

### **3. People, Institutions, and Organizations Asked for Opinion:**

Afaprefabrik Prefabrike Beton San. Tic.A. Ş.  
Ankara Chamber of Industry  
Ankara Chamber of Commerce  
Concrete Agent Manufacturers Union  
Bosphorus University, Faculty of Engineering, Department of Civil Engineering  
Directorate General of State Hydraulic Works, Department of Project and Civil Works  
Dokuz Eylül University, School of Engineering, Department of Civil Engineering  
Gazi University, Faculty of Technology  
Chamber of Civil Engineers, Ankara Branch  
İstanbul Technical University, Faculty of Civil Engineering, Department of Civil Engineering  
KAM Ankara Beton Sanayi A.Ş.  
Karadeniz (Blacksea) Technical University, School of Engineering, Department of Civil Engineering  
Foundation of Supporting Occupational Training and Small-Scale Industry  
Ministry of National Education, General Directorate of Technical Education For Boys  
Middle East Technical University, Faculty of Engineering, Department of Civil Engineering  
T. R. Ministry of National Education, General Directorate of Apprenticeship and Non-Formal Education  
Republic of Turkey Ministry of Public Works and Settlement, General Directorate of Construction  
Republic of Turkey Ministry of Labour & Social Security, Center For Labour & Social Security Training and Research, ÇASGEM  
Republic of Turkey Ministry of Labour and Social Security, General Directorate of Occupational Health and Safety  
Republic of Turkey Ministry of Labour & Social Security, Social Security Institution's Directorate of Construction and Property Affairs  
Republic of Turkey Turkish State Railways, TCDD – Directorate of Construction and Property Affairs  
Republic of Turkey Ministry of National Education, Directorate of Educational Research and Development  
Republic of Turkey Ministry of Transportation, General Directorate of Highways - The Board of Higher Education  
Turkish Accreditation Agency, TÜRKAK  
Association of Turkish Consulting Engineers And Architects- TMMMB



Turkish Cement Manufacturers' Association  
Confederation of Turkish Tradesmen and Craftsmen, TESK  
Turkish Ready Mixed Concrete Association  
Turkish Construction Contractors Union, TİM-SE  
Confederation of Turkish Trade Unions, TÜRK-İŞ  
Turkish Confederation of Employer Associations, TİSK  
Turkish Contractors Association, TMB  
Turkish Union of Chambers and Exchange Commodities, TOBB  
Turkish Prefabrication Union  
Turkish Official Sector of Construction Contractors Union, TÜRK-İNŞA  
Turkish Union of Road Construction and Building Workers, YOL-İŞ  
Yapı Merkezi Prefabrikasyon A.Ş.  
Federation of Building Products Manufacturers  
Yıldız Technical University, School of Engineering, Department of Civil Engineering

#### 4. Sector Committee Members and Experts

Mustafa DEMİR,	President	Turkish Confederation of Employer Associations
Ekrem DİRİER,	Vice President	Ministry of National Education
Ahmet Emin YİĞİT,	Member	Ministry of Environment and Urban Planning
Kemal AYDOĞAN,	Member	Ministry of Labor and Social Security
Abdülkadir YILMAZ,	Member	Ministry of Communication
Can BALKAYA,	Member	Board of Higher Education (YOK)
H.Necati ERSOY,	Member	Turkish Union of Chambers and Exchange Commodities (TOBB)
TOBB) Mustafa ARSLAN,	Member	Confederation of Turkish Tradesmen and Craftsmen (TESK)
Hacı ÜSTÜNDAL,	Member	HAK Trade Unions Confederation
Aylin RAMANLI,	Member	Occupational Qualification Authority
Firuzan SİLAHŞÖR,	Department Head	Occupational Qualification Authority
Sinan GERGİN,	Representative of Sector Committee	(Administration For Disabled and Elderly People)

#### 5. Executive Board

Bayram AKBAŞ,	President	Representative of Ministry of Labour and Social Security
Prof. Dr. Oğuz BORAT,	Vice President	Representative of Ministry of Education
Assistant Prof.. Dr. Ömer AÇIKGÖZ,	Member	Representative Board of Higher Education
Prof. Dr. Yücel ALTUNBAŞAK,	Member	Representative of Professional Organizations
Dr. Osman YILDIZ,	Member	Representative of Confederation of Turkish Trade Unions
Celal KOLOĞLU,	Member	Representative of Turkish Confederation of Employer Associations