2020 the 8th International Conference on Mechanical Engineering, Materials Science and Civil Engineering (ICMEMSCE2020)

November 24, 2020

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Simple Version of the Schedule

ICMEMSCE2020 WEBINAR					
Programme detail November 24, 2020 (Tuesday)					
Thailand (Standard Time)		Japan & South korea	China	Perú	Russia
8:00-13:00		10:00-15:00	9:00-14:00	20:00-1:00	4:00-9:00
Plenary Session (Standard Time)					
8:00-8:30	Plenary Speech - Prof. Katsuyuki Kida		Speech Title:Magnetic microscopy of structural steels under fatigue loadings		
KeynoteSession (Standard Time)					
8:30-9:00	Keynote Speech 1 - Prof. Fu-yuan Gong		Speech Title: Towards service life prediction of concrete structures rooted in micro-deterioration mechanisms		
9:00-9:30	Keynote Speech 2 - Prof. Dong-Won Jung		Speech Title: Investigation of Metal Forming Operations		
9:30-10:00	Keynote Speech 3 - Assoc. Prof. Aidah Jumahat		Speech Title: Influence of nanofillers on mechanical properties of natural fibre composites		
10:00-10:30	Keynote Speech 4 - Prof. Koshiro Mizobe		Speech Title: Effect of surface hardening methods (IH and FIH) on the various types of rolling contact fatigue (ball-		
10:30-11:00	Keynote Speech 5 - Dr. Takahiro Matsueda		Speech Title: Non-destructive detection of microcracks in flexible solar cell using AE and thermography		
11:00-11:10	Photo & Break Time				
11:10-13:00	Session				

Note:

1. All the participants are strongly advised to attend 10 minutes before the Webinar is start.
2. Zoom ID and instructions will also be sent 7 days before the conference.
3. The standard time for all programs is Thailand Time
4. If you want to deliver oral presentation but your paper is not in the session list, please contact us by Email: cfp@icmemsce.org (for ICMEMSCE2020)

Instruction about Oral Presentation

Materials Provided by the Presenters:

PowerPoint or PDF files

Duration of each Presentation:

Regular Oral Session: About 10 Minutes of Presentation and 3 Minutes of Q&A.

Plenary speech

November 24, 2020 (8:00-8:30)

Professor Katsuyuki Kida

University of Toyama, Japan

Speech Title: ***Magnetic microscopy of structural steels under fatigue loadings***

Professor Katsuyuki Kida was born in 1968 in Osaka, where he studied mechanical engineering at Osaka University from 1988. Apart from course work, he studied rolling contact fatigue (RCF) occurring in TiC and TiN coated steels using both X-ray diffraction and scanning acoustic microscopy. After graduation he pursued his academic career and obtained a Ph.D. in engineering mechanics in 2000, investigating RCF problems of all-Si3N4 bearings. By observing cracking and flaking failure under RCF, he succeeded in explaining the material`s features from the viewpoint of fracture mechanics. From 2000 he focused his work on investigating the contact problems of several materials used in machine elements. He has also continued fundamental research on contact problems, for which he received 'The Best Paper Prize (FFEMS PRIZE)' from 'Fatigue & Fracture of Engineering Materials & Structures' journal in 2005. The awarded papers reported establishing a crack growth mechanism under contact pressure, a problem previously unsolved for over 70 years since S. Way's proposed theory. His research interests now include the development of three dimensional scanning Hall-probe microscope technologies, fatigue phenomena in polymer bearing, crack growth mechanism under contact stresses and refinement of high-carbon steels. He holds and has held a number of prestigious leadership roles in academy-industry corroboration programs: refinement of steels, new joint system in humanoid robots and fatigue of polymer bearings in "Strategic Fundamental Technologies Strengthening Assistance Programs" (Ministry of Economics, Trade and Industry, Japan, 2009-2013); scanning Hall-probe microscopy in "Fundamental Studies on Technologies for Steel Materials with Enhanced Strength and Functions" (Consortium of the JRCM, Japan,

2008-2012); and ceramic bearing elements in the project supported by "Japanese Energy and Industrial Technology Development Organization" (NEDO, Japan, 2007-2011)." As a chairperson of department of mechanical engineering in University of Toyama, Professor Kida is heading education and research projects (2019-)."

Keynote speech 1

November 24, 2020 (8:30-9:00)

Professor Fu-yuan Gong

Zhejiang University, China

Speech Title: Towards service life prediction of concrete structures rooted in micro-deterioration mechanisms

Dr. Fu-yuan Gong graduated from Tsinghua University (China) for his Bachelor's Degree, and then got the Master's and Doctor's Degree from Hokkaido University (Japan). After that, Dr. Gong worked as a post-doctor researcher in The University of Tokyo and then moved to Yokohama National University as the Assistant Professor. Currently Dr. Gong is working as the 'ZJU 100 Talents' Professor in College of Civil Engineering and Architecture, Zhejiang University. His research interests includes: concrete durability; thermodynamics, poromechanics and micromechanics for porous material; computational modeling; Life time assessment, etc. Dr. Gong has been selected as the JSPS (Japan Society for the Promotion of Science) Research Fellow (2014 - 2016), and visiting scholar in Princeton University (2012). In the last 5 years, Dr. Gong has published over 50 international journal and conference papers, of which 19 journal paper are indexed by SCI. He has also been awarded the 'Best Three Papers' from Journal of Advanced Concrete Technology in 2013, Japan Concrete Institute (JCI) Award in 2014, and Achievement Award for Young Engineers by fib (The International Federation for

Structural Concrete) in 2017. Currently, Dr. Gong serves as the Associate Editor of Journal of Advanced Concrete Technology.

Keynote speech 3

November 24, 2020 (9:00-9:30)

Professor Dong-Won Jung

Jeju National University, South Korea

Speech Title: Investigation of Metal Forming Operations

Professor Dong-Won Jung works in School of Mechancial Engineering. He has rich experience in metal forming field. He is a professional reviewer of plenty Journals, such as KSME (Korean Society of Mechanical Engineers), KSPE (Korean Society for Precision Engineering), KSTP(Korean Society for Technology of Plasticity), KSAE(Korean Society for Automobile Engineers), Journal of Ocean Engineering and Technology, Journal of Korea Society for Power System Engineering, the Korean Journal of CAE, etc. He also has lot of publications and academic conference experiences.

Keynote speech 3

November 24, 2020 (9:30-10:00)

Assoc. Prof. Aidah Jumahat

Universiti Teknologi MARA, Malaysia

Speech Title: Influence of nanofillers on mechanical properties of natural fibre composites

Jumahat A is an Professor of the Faculty of Mechanical Engineering at Universiti Teknologi MARA (UiTM) Malaysia. She has been giving lectures on Composite Materials, Finite Element Method, Mechanics of Materials, Manufacturing Processes, Engineering Design and Advanced Materials, which happens to be her areas of research interest, since 2001. She also currently serves as Director of Community of Research for Frontier Materials and Industrial Applications at the Deputy Vice Chancellor Office UiTM since 2016. She received her MSc degree (2002) and B.Eng. (Hons.) degree in Mechanical and Materials Engineering (1999) from the Universiti Kebangsaan Malaysia. She received her Ph.D. degree in Mechanical Engineering from the University of Sheffield United Kingdom in 2011. She has published more than 200 technical papers in journals, chapters in book and conference proceedings locally and internationally in materials and mechanical engineering research areas.

Keynote speech 4

November 24, 2020 (10:00-10:30)

Prof. Koshiro Mizobe

University of Toyama, Japan

Speech Title: Effect of surface hardening methods (IH and FIH) on the various types of rolling contact fatigue (ball-shaft and ball-plate)

Koshiro Mizobe is an assistant professor in the Department of Mechanical Engineering at the University of Toyama, Japan. He has published over 50 papers in various research fields including: evaluation of stress intensity factors, repeated heating, homology evaluation of microstructure, and polymer bearings. Koshiro studied mechanical engineering at Kyushu University, Japan, graduating in 2013. He studied the repeated quenching refinement method of high-carbon chromium steels in his PhD course. For this work he received the Research Fellowship for Young Scientists in 2013-2014 from the

Japan Society for the Promotion of Science as well as Top Young Researcher Award in 2012 from Kyushu University. Since 2015 he has been an assistant professor in the Department of Mechanical Engineering at the University of Toyama. He has won some best paper awards from international committees (ICMDME, CMPSE and ICMTM) and received some grants (25th ISIJ research promotion grant from the Iron and Steel Institute of Japan and research promotion grant from JKA). His current research topics with a brief explanation are as follows. Repeated heating method Martensitic high-carbon high-strength bearing steel is one of the main alloys used for rolling contact applications where high wear resistance is required. Refining the prior austenite grain size through repeated heating is a process commonly used to enhance the material's strength. He studied the effect of repeated heating on the microstructure near inclusions through the rolling bending fatigue tests. Development of hybrid polymer bearings Koshiro is focusing on polymer bearings because it is suitable for the no lubricant situation and the corrosive situations. In particular, he focuses on PEEK which is a tough semi-crystalline thermoplastic polymer and PTFE which has low friction coefficient. Now, he develops the combination of PEEK races-PTFE retainer bearings.

Keynote speech 5

November 24, 2020 (10:30-11:00)

Dr. Takahiro Matsueda

University of Toyama, Japan

Speech Title: Non-destructive detection of microcracks in flexible solar cell using AE and thermography

Takahiro Matsueda is an assistant professor in the Department of Mechanical Engineering at the University of Toyama, Japan. He has investigated evaluation of fatigue strength of steel, stress intensity factors of microcrack, nondestructive testing and evaluation of material strength such as solar cell, ceramics and polymer. Takahiro

Matsueda graduated from mechanical engineering at Kyushu University, Japan, in 2014. He majored in evaluation method of fatigue strength with notched steel in a PhD course. He was an assistant professor in the Department of Mechanical Engineering at the Tokyo Metropolitan University from 2015 to 2019. He has been an assistant professor in the Department of Mechanical Engineering at the University of Toyama from 2020. He has also won awards for research from international committees (ICSMMS, ICMEMSCE and ICMTM). Brief introductions of current research topics are as follows. Nondestructive evaluation of materials using AE and LT techniques Takahiro Matsueda's research aims to reveal the mechanisms of microcrack initiation and accumulation, and their contribution to the electrical degradation during fatigue fracture. He detected and identified microcrack initiation using the acoustic emission (AE) and Lock-in thermography (LT) techniques. The electrical degradation of solar cell was evaluated by monitoring electrical power calculated from Current-Voltage (I-V) curve. Furthermore, microdamage contributing to the electrical degradation were identified by Lock-in thermography (LT). He proposed the method to evaluate microcrack initiation using the AE, LT and I-V curve. Prediction method of fatigue limit in metal materials Takahiro Matsueda is studying the new prediction method based on fracture mechanics for safely design. In particular, he focuses on improvement of the method to define the fatigue crack shape and propagating during fatigue test.

11:00-11:10	Photo & Break

Speech Session

November 24, 2020 (11:10-13:00)

1. Paper ID: MS1007

Title: Analysis of Soft Story and Torsional Irregularity Factors in the Seismic Performance of Reinforced Concrete Buildings by Nonlinear Static Analysis

Authors: Wilmer Lagos, Oriol Blas, and Junior Orihuela

Abstract: The seismic design of irregular buildings is usually developed using an irregularity factor according to its nature. However, seismic stresses are impacted as the irregularity approaches the extreme limit. In this study, we analyzed the soft story and

torsional irregularity factors of reinforced concrete structures with structural system: frame, dual and structural walls of 5, 7 and 10 floors respectively. To this end, a Nonlinear Static Analysis (NLS) - Pushover was carried out. This analysis is carried out in two stages. First, a regular structure is analyzed in plan and in elevation, which is the regular model. Second, the geometry of the regular structure is modified in plan and in elevation in order to perform the same analysis, so as to show irregularity due to soft story and torsion. The purpose is to obtain the structural response with variations of both irregularities from minor to major. Lastly, the seismic stresses obtained from the irregular models are compared with the regular model response, and then, new irregularity factors are proposed for the cases studied.

2. Paper ID: MS1005

Title: A transmissibility concept to reduce displacement demand in seismically isolated buildings

Authors: Gerardo Soto Delgado, Rodrigo Vente Silva and César Morales Velasco

Abstract: An initial design method is developed using the relative transmissibility concept to solve the problem of large base displacement (displacement demand) in isolated structures under the action of earthquakes. The procedure is developed in the frequency domain, this to obtain the stiffness and damping of the isolation system. Subsequently, a multiple degree of freedom benchmark structure model is used, excited by a real seismic input signal for the evaluation of the design procedure; the proposal is a purely passive control. The results show the effectiveness of this methodology due to the fact that base displacement obtained with a purely passive control system are very close to the displacement achieved with the use of active control systems that are more complex and expensive.

3. Paper ID: MS1008

Title: Seismic response of reinforced concrete structures by a non-linear time-history analysis using artificial accelerograms

Authors: D L Coronel, M V Mamani, C A Morales-Velasco and J O Ruiz

Abstract: The lack of large seismic records in some world regions limits the determination of the seismic response of a building. For that reason, artificial accelerograms represent an alternative to define the seismic event because they consider specific conditions of study site. This research analyses the structures seismic response for various artificial seismic records generated from design spectra and different geotechnical conditions. Dynamic nonlinear time history analyzing was used to

obtain greater precision in the seismic response. The results obtained show that the mezzanine drifts of the artificial signals created with the Liu envelope better fit the drifts obtained from the scaled real earthquake.

4. Paper ID: MS1009

Title: Evaluation of diaphragm flexibility for different mezzanine slab systems in reinforced concrete buildings located in areas of high seismic hazard

Authors: Fernando T. Ybarra, Wilmer B. Pumarrumi, Cesar A. Morales-Velasco, c and Jose O. Ruiz

Abstract: The behavior of the diaphragm of a mezzanine system affects the seismic response of reinforced concrete structures, therefore, assuming the rigid diaphragm hypothesis for slab systems that are being incorporated into the construction market, leads to mistakes in the analysis and design of some buildings. Likewise, American codes such as ASCE / SEI 7-10, FEMA 356, ACI 318-19 and South American standards present minimal discussion regarding this problem. In this study, the behavior of the diaphragm in typical reinforced concrete buildings with the following systems of mezzanine slabs is evaluated: unidirectional and bidirectional slab, slab with steel deck and slab with prestressed joists, using a static non-linear pushover analysis. According to the results of the parametric analysis, it was possible to conclude that, for low buildings without shear walls, the slab systems tend to behave as a rigid diaphragm up to a plan aspect ratio of 3. On the other hand, in tall buildings with shear walls. slab systems tend to behave as a rigid, semi-rigid and flexible diaphragm, so the aspect ratio in plan and the mezzanine slab system are important factors to be analyzed to avoid errors in the analysis and design of this type of buildings.

5. Paper ID: MS1011

Title: Effect of Sintering Temperature on Mechanical Property of Ti + ZrO_2 Prepared by Spark Plasma Sintering for Biomedical Applications

Authors: Tanapon TANSIRANON, Katsuyoshi KONDOH, Kazuhiro ISHIKAWA, Yoji MIYAJIMA, and Anak KHANTACHAWANA

Abstract: This paper aims to investigate effect of spark plasma sintering temperature on mechanical property of Ti + ZrO_2. The samples were prepared by SPS system with the different sintering temperature containing 900, 1,000, and 1,100 °C under the pressing pressure of 30 MPa in vacuum. The results show that hardness of Ti + 2 wt.% ZrO_2 alloy increases with increasing sintering temperature. The highest hardness was 363 HV while

suitable temperature for sintering Ti + 2 wt.% ZrO_2 alloy was 1,100 °C. Further, the microstructure and crystal structure of all samples were single-α-phase structure with different in elements dispersion, which was related to amount of lattice expansion in the HCP structure.

6-Paper ID:9

Title: Design & Development of a Mold for Patternless Casting using AM/3D Printing

Authors: Taha Waqar, Muhammad Azhar Ali Khan, Muhammad Asad, Faramarz Djavanroodi , Jamal Nayfeh

Abstract: Additive manufacturing is a technology that is influencing every facet of manufacturing such as casting. 3D printing in particular has the potential to revolutionize castings in terms of precision and time taken in production. Patternless molds increase the efficiency of the casting process for large scale manufactured components. Therefore, ceramic based molds can be utilized for low temperature alloy parts such as mounting brackets. Nowadays, 3D printing technologies allow the direct printing of these molds. This is possible with the aid of CAD modelling of the casting mold which allows instant printing of patternless molds. The aim of this work is to introduce an approach to prepare a 3D design for a casting mold that can be manufactured using 3D printing technology. Mold design was made using Solidworks software according to standardized calculations from which cope and drag components were extracted. Candidates for potential mold material are highlighted along with advantages & limitations of utilizing 3D printing methodology.

7-Paper ID: 12

Title: Reinforcement of Epoxy Resin by Lignin

Authors: Supicha Piyanirund, Wichudaporn Seangyen, Penjit Srinoppakhun and Peerapan Dittanet

Abstract: Diglycidyl ether of bisphenol A (DGEBA) epoxy resin with cycloaliphatic polyamine curing agent was modified with lignin to improve thermal and mechanical properties of of polymer composite. A systematic study of lignin loading, between 5 and 20 phr (per hundred parts resin) as compared to neat epoxy, was conducted for the reinforcement effect of epoxy resin composites. With the as-received lignin having spherical particles of 80 to 100 microns in diameter, the Tg of the epoxy-filler composites increased with a small addition of lignin up to 10 phr. Likewise, the yield stress and stiffness (Young's modulus) of the epoxy resin-lignin composites significantly increased to a maximum value of 49.32 MPa and 2.75 GPa, respectively, with 10 phr lignin, due to

the higher modulus of the filler compared to the bulk epoxy resin. Correspondingly, the storage moduli of the lignin-containing composites also increased upon filler addition up to 10 phr due to the impact of lignin. Conversely, however, the tanδ decreased in intensity with increasing lignin filler content, which reflects the dampening effect due to restricted chain mobility in thepresence of lignin particlesin epoxy systems.

8- Paper ID: 13

Title: Wetting Angle of Lead On Structural Steels And Ceramic Materials For Temperatures 350 - 85°C

Authors: Leonardo Paredes Pires, Aleksandre Borisovich Kruglov and Victor Borisovich Kruglov

Abstract: The report presents a description of an installation for measuring the contact angle of wetting of surfaces of solids with metal melts by the lying drop method and the results of studying the wetting on steels and ceramics with lead in an argon atmosphere for a temperature range between 300-850 C. The method consist in two phases, at first, we heat up the lead drop on steel or ceramic disks and then cool down in an atmosphere of argon.

9- Paper ID: MS1017

Title: Observation of crack originating from non-metallic inclusions in furnace-induction heated SUJ2 steel under one-point rolling contact fatigue at high contact pressure

Authors: Koshiro Mizobe, Yuto Nakamura, Yuki Yano, Takahiro Matsueda, Katsuyuki Kida

Abstract: It is important to reveal the mechanism of crack growth from non-metallic inclusions because it commonly causes the origin of flaking fracture. In order to observe the cracks initiated from non-metallic inclusions under contact pressure, we performed one-point rolling contact fatigue tests using furnace-induction heated SUJ2 steel. We measured the hardness distribution of the furnace-induction heated (FIH) specimen and observed cracks with the inclusions at cross-sections.

10- Paper ID: 16

Title: Investigation of twist defect in Single Point Incremental Forming (SPIF) Process

Authors: MUHAMMAD SAJJAD, MOHANRAJ MURUGESAN, DONG WON JUNG

Abstract: Single point incremental forming (SPIF) is a choice of interest in many manufacturing industries due to its wide range of applications. Materials such as copper, aluminum, steel, and many others formed various complex shapes through this process. However, the forming process could sometimes result in process defects, which could strongly influence the formed parts' geometric accuracy. The twist defect is one of them,

which incrementally twists the forming sheet with a small angle at each forming step. In this paper, twist phenomena in the SPIF process have been investigated both numerically and experimentally. In the experiment, Aluminum Alloy (AA5052) was used to form a truncated pyramid shape, and a room temperature tensile test has been conducted to achieve the material's tensile properties. Then, the material property used in the simulation study of the SPIF using LS-DYNA software, where twist defect, stresses, strain, and thickness distribution are studied. The results from simulation and experiment show significant similarity against the expected results and this conveys that the proposed FE model of the SPIF process can be used to investigate the presence of twist, distributions of stress and strain, and thinning locations in the formed part.

11- Paper ID: 17

Title: Assessing material properties of commercial magnesium alloy with digital image correlation (DIC) technique for forming applications

Authors: Mohanraj Murugesan, Muhammad Sajjad, Dong Won Jung

Abstract: The engineering field's main issues are often identified to be estimating the deformation and the strain measurements of the working material. Gauging displacements until the fracture more accurately is crucial in experimental procedures for assessing the chosen material properties. This research paper investigates the commercial magnesium alloy (AZ31B) material using digital images, often called Digital Image Correlation (DIC), which provides complete displacement and strain data information at each timestep rather than utilizing an extensometer. This method provides images taken during the deformation, and subsequently, the material properties computed using correlation software for tested samples. The plastic anisotropy coefficients are computed for test samples that cut down at angles of 0, 45, and 90 to the rolling direction. Also, the tensile test finite element model until the necking region was used to verify the fitted models such as Hollomon power-law and Ramberg–Osgood relationships to define the non-linear relationship between stress and strain. Hence, real models and numerical simulations of incremental forming are created to depict this research work's usefulness to the forming applications.

Poster Session

1- Paper ID: MS1004

Title: On some errors in seismic data in highly-cited literature on base isolation

Authors: César A. Morales

Abstract: Several errors have been found in information and data of seismic records in academically published work. These inaccuracies involve use of vertical instead of horizontal signals, wrong peak velocities and peak accelerations. The mistakes were encountered in top cited publications regarding near-fault effects and the large base displacement problem in isolated structures. A possible reason for these errors is suggested.

2- Paper ID: MS1013

Title: Improvement of gravelly silty sand reinforced with biaxial bamboo geogrid

Authors: Alex Llauce , Gary Duran and Carlos Fernandez

Abstract: In this paper, performance of silty sand soil reinforced with geogrid are present and analyzed to improve the carrying capacity. For this, the geogrid was elaborated with a renewable material like bamboo with the same dimensions of polymer geogrids biaxial. This type of soil can be used for the construction of the sub-base and base of a pavement. California Bearing Ratio (CBR) tests was carried out to obtain the bearing capacity of the silty sand soil with and without bamboo geogrid. In addition, laboratory tests were carried out to obtain the mechanical properties of the bamboo. When comparing CBR results, an improvement in the bearing capacity was evidenced with the use of bamboo geogrid with a 20% increase in the carrying capacity. Finally, maximum tensile and bending strength of bamboo were 2000 kgf/cm2 and approximately 0.018 kgf/cm, respectively.

3- Paper ID: MS1015

Title: On some errors in seismic data in highly-cited literature on base isolation

Authors: RETO Alexandra, SANABRIA Renzo, RODRIGUEZ José3 and HINOSTROZA Alexandra

Abstract: The precast concrete elements in the construction of buildings are increasingly used due to their better quality control, constructive speed, reduction of the number of workers and less waste of resources compared to conventional construction; for wall applications, to these advantages, the design to ensure thermal comfort requires the improvement of the low thermal insulation of conventional concrete panels.

The use of materials with lower thermal conductivity such as Expanded PolyStyrene Beads (EPSB) in lightweight concrete for the construction of precast panels in housing, contributes to improve thermal insulation and the saving operational energy during its

operation phase, because the aggregate has a small size, low density and thermal conductivity; applied in higher volumes in concrete, reduces indoor heat loss in cold climates and indoor heat gain in warm climates in housing. The purpose of this research is to study the behavior of lightweight concrete with EPSB for 16%, 26% and 36% addition and evaluate the air-dry density, compressive strength, thermal conductivity, relationship between air-dry density with compressive strength and thermal conductivity. The results indicate that the higher the percentage of EPSB the air-dry density, compressive strength and thermal conductivity decrease; the relationships between air-dry density with compressive strength and thermal conductivity follow a linear trend and are similar.

4 Paper ID: 14

Title: Characterization of the physical and mechanical properties of concrete with polypropylene fibers for solid mezzanine slabs of multi-family homes

Authors: CCASANI Jean, EDUARDO Carlos, RODRIGUEZ José and EYZAGUIRRE Carlos

Abstract: The significant increase in the construction of buildings has led to the appearance of different phenomena that affect the elements that make it up. Due to their large area, in contact with the surface, solid slabs are the most vulnerable to these effects. The appearance of cracks at an early age is one of the most recurrent problems in concrete slabs, which is why it is important to counteract the presence of cracks to improve their mechanical properties to obtain buildings with greater durability. For this, the incorporation of polypropylene fibers has become one of the best alternatives to mitigate the appearance of cracks. In the present investigation, two concrete mixtures reinforced with polypropylene fibers of two lengths will be evaluated and tested for slump, plastic shrinkage, compressive strength and residual flexural strength.