

# **World Plumbing Council United Association Instructors Training Program Scholarship 2018**

Ann Arbor | Michigan | USA  
06<sup>th</sup> August – 1<sup>st</sup> September 2019

## **REPORT**



## **Sudip Das**

WPC UA ITP Scholarship Recipient 2018  
DCE, GPAT, AFIAP, EFIP, Hon PESGSPC, GPA.PESGSPC  
P-520, B L Saha Road | Kolkata 700053 | WB | India  
m: +91 97487 04575 | e: sudipdas1972@gmail.com

## Content

1. Letter to WPC	03
2. Letter to UA	04
3. Foreword	05
4. Introduction	07
5. Background	13
6. Report	15
7. My Scholarship Calendar	37
8. Acknowledgement	40
9. Executive Summery	45
10. My Scholarship Album	50
11. Reference	65

**Sudip Das**

DCE | GPAT | AFIAP | EFIP |  
GPA.PESGSPC | Hon PESGSPC (Cyprus)  
WPC UA ITP Scholarship Recipient 2018

P-520, B L Saha Road | Kolkata  
700053 | WB | India  
+ 91 9748704575  
sudipdas1972@gmail.com

**Date: 5<sup>th</sup> September 2019**

**To,**  
**The Chairman,**  
**World Plumbing Council**  
**Zurich, Switzerland**

**Sub: Expressing my gratitude for selecting me for the WPC UA ITP Scholarship 2018**

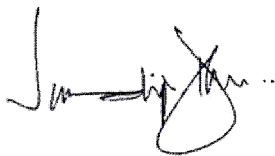
Dear Sir,

I am hereby expressing my sincere gratitude to World Plumbing Council and also to United Association for selecting me as the recipient of World Plumbing Council United Association Instructor Training Program Scholarship 2018 and giving me the opportunity to participate in the ITP at Ann Arbor, MI, USA, this August 2019. I am also grateful for arranging the visit to different training centers, job sites and to meet a number of people related to the plumbing industry in USA. The training and visits have enriched my knowledge and the exposure to the modern world of plumbing education and practices will help me a lot in my career.

I also wish both World Plumbing Council and United Association a great success in the journey towards a safe and improved future and to make the world a healthy living place.

I hope our relation will continue in the future.

Thanking you,  
Yours truly,



(SUDIP DAS)  
Kolkata  
05/09/2019

*Sudip Das*

DCE | GPAT | AFIAP | EFIP |  
GPA.PESGSPC | Hon PESGSPC (Cyprus)  
WPC UA ITP Scholarship Recipient 2018

P-520, B L Saha Road | Kolkata  
700053 | WB | India  
+ 91 9748704575  
sudipdas1972@gmail.com

**Date: 5<sup>th</sup> September 2019**

**To,**  
**The General President,**  
**United Association,**  
**Annapolis, USA**

**Sub: Expressing my gratitude for selecting me for the WPC UA ITP Scholarship 2018**

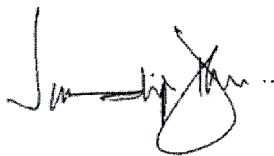
Dear Sir,

I am hereby expressing my sincere gratitude to United Association and also to the World Plumbing Council for selecting me as the recipient of World Plumbing Council – United Association Instructor Training Program Scholarship 2018 and giving me the opportunity to participate in the ITP at Ann Arbor, MI, USA, this August 2019. I am also grateful for arranging the visit to different training centers, job sites and to meet a number of people related to the plumbing industry in USA. The training and visits have enriched my knowledge and the exposure to the modern world of plumbing education and practices will help me a lot in my career.

I also wish both United Association and World Plumbing Council a great success in the journey towards a safe and improved future and to make the world a healthy living place.

I hope our relation will continue in the future.

Thanking you,  
Yours truly,



(SUDIP DAS)  
Kolkata  
05/09/2019

# Foreword

It was 1<sup>st</sup> of September 2016, I received a mail from IAPMO inviting application for World Plumbing Council Scholarship Program. Though I found that interesting but my effort was not enough due to shortage of time that year. Next year also I couldn't apply for my personal reason.

In 2018 I got only 2 days to complete all documentations and I was able to submit only at the closing hour on 22<sup>nd</sup> of September 2018.

This time also my expectation was not very high though optimism is my strength always.

Monday, November 26th, 2018; - I woke up in the morning and I opened my mobile to check messages and the first thing I noticed was a mail from WPC secretariat, my heart stopped after reading the first line which said,

*"Dear Sudip,*

*I'm very pleased to advise that you are the recipient of the 2018 WPC  
United Association Instructor Training Program Scholarship!"*

I was speechless for a greater part of a minute before I could able to convey the good news to my family members and others. But still it took hours to believe that it really happened.

Next few days were full of hustle and bustle, in one hand communicating with WPC to complete the initial formalities and in the other hand to respond to my friends, acquaintances and well wishers against their congratulation messages and attending phone call. But honestly the business I enjoyed.

# Introduction

## The Author

### Early Life & Family:

I, Sudip Das, was born 13<sup>th</sup> July 1972 in a Bengali family and elder of the two children of Late Pradip Kr Das, a civil engineer and Snighdha Das, a teacher. My schooling and early days were spent in Kolkata. I had been married to Sumita, a teacher in 2009 and blessed with a daughter Suneha in 2010. Sister and brother in law Swarnali and Pankaj Laha and niece Poushali are also part of my extended family with a close bondage.

### Education and Career:

I completed my Diploma in Civil Engineering from Kolkata in 1997 and started my career in Kolkata. From 1997 till mid 2006 I worked in various architectural consultancy, civil construction, high pressure explosive chemical pipelines and storage companies across the length and breadth of India from Assam in the extreme East to Punjab, Himachal Pradesh in the West, and from Northern states like Uttar Pradesh to Tamil Nadu in the South.

On 10<sup>th</sup> July 2006 I joined Sanitary Syndicate Pvt Ltd, which is a 60 years old Contracting as well as Consultancy company in the field of Sanitary Plumbing and Fire Safety having its Head Office in Kolkata. And that was the beginning of my love for plumbing. Our Managing Director, Mr. D. K. Roychoudhury (recipient of Lifetime Achievement Award in PHE in India) was my main motivator in my early days in the company. The other two directors Mr Ramaprasun Mitra and Mr S. K. Roychoudhury also helped me, encouraged me and indulged me a lot to take part in various activities which helped me enriching my knowledge in the subject.

In the company I have been entrusted with Planning and Project coordination and involve in many prestigious and landmark projects in eastern India ranging



from residential to commercial, hospitality to healthcare, assembly to infrastructure and many more.

### **Connection with IPA:**

In the year 2010, I became a life member of Indian Plumbing Association though my connection was from the very beginning of the association's Kolkata chapter's journey. I am actively involved in various activities of the organization. I was part of the organizing committee for the national conference in both the occasions when our Kolkata chapter was the organizer, in 2010 and 2016.

### **Academics:**

In the year 2010, I had been selected from Kolkata chapter to take part in the "Train The Trainer" program by Green Plumbers India and been conferred with "Green Plumbers Accredited Trainer and Specialist" (GPAT).

Since 2014 I started giving training both in-house as well as to various engineering colleges and institutions like Jadavpur University, JIS Engineering College, George Telegraph Training Institute etc.

Since 2016 I was engaged in teaching the students for Indian Plumbing Sector Skill Council under National Skill Development Corporation (Govt of India).

I also train the students under RPL (Recognition through Prior Learning), - this is for the plumbers who have hands on working experience but no formal training.

In 2018 I was honoured as the 'Jury' member for Odisha Skill Competition at Bhubaneswar, which was the 2<sup>nd</sup> round qualifier for World Skill Competition 2019 Kazan.

I was trainer and gave lecture to the participants of Indian Plumbing Professional League in 2018 and 2019. This is a plumbing talent hunt program for qualified engineers and architects.

This year I had been engaged as Senior Trainer for Plumbing Trade for the ADB MSSDS Meghalaya Project. This is a skill development project and a joint initiative by Asia Development Bank and Government of Meghalaya.

### **Hobby & More:**

Apart from my professional career and achievements my hobbies are reading, travelling and photography. About 370 photographs were exhibited in more than 60 international and 20 national exhibitions in 26 different countries and awarded with a number of international and national awards including international Gold medals. I had also been conferred with many international diplomas and distinctions in the subject. I am also a teacher in photography. I also achieved eligibility for being International Judge in photography.

## **Indian Plumbing Association**

Indian Plumbing Association is a voluntary organization of plumbing professionals, having more than 4,000 members across the country from every segment of building industry including consultancy, manufacturing, contracting, trading, academia and architecture. IPA is to promote the advancement of plumbing services in the country by organizing seminars, exhibitions, symposia to educate members of the trade and general public.

IPA also has developed 'Uniform Plumbing Code of India' in collaboration with IAPMO. A separate technical committee has been set up for the purpose. IPA is working actively to spread awareness about the necessity and importance of plumbing, conservation of water and to protect our mother earth. In the year 2018 IPA had completed its 25 years of journey.

## World Plumbing Council

The World Plumbing Council (WPC) is an international organization which aims to achieve the best possible plumbing for the world through growth and development of the world's plumbing industries. The WPC is made up of plumbing associations and plumbing industry participants from all over the world. There are currently over 200 members of the WPC from more than 30 countries around the world.

World Plumbing Day is an international event on March 11 every year, initiated by the World Plumbing Council as a means of highlighting the important role plumbing plays in the health, safety and sustainability of our community.

The WPC hosts the World Plumbing Conference once every three years. This year the triennial conference was held in September 2019 in Melbourne, Australia.

## United Association

The United Association of Journeymen Plumbers, Gas Fitters, Steam Fitters, and Steam Fitters' Helpers of the United States and Canada, was officially founded on October 11, 1889. Gradually, former members of rival Unions joined the United Association.

In the first half of the century, the United Association moved to formalize apprenticeship training programs, including making a five-year apprenticeship mandatory in 1921, and in 1938 holding that all apprentices be members of the United Association and attend related training classes. Its National Plumbing Apprenticeship Plan of 1936 was the first set of standards governing apprenticeship to win approval of the federal government.

With expanded training programs beginning in 1956, the UA was able to meet the demands of accelerated construction activity in the 1960s. With the increased work the slogan, "There is no substitute for UA skilled craftsmen" became widespread throughout the industry. By 1971 the UA was 320,000 strong.

According to UA's reports to the Department of Labor since 2000, the union has consistently had about 93% members in "building trades", the remaining 7% in "metal trades". Out of the total membership, most are considered "journeymen", with about

12% considered "apprentices". As of January 1, 2017, fourth and fifth year apprentices are eligible to vote in the union.

The objects of this Association are to protect its members from unjust and injurious competition, and secure through unity of action among all workers of the industry throughout the United States and Canada, claiming, as we do, that labor is capital, and is the only capital that possesses power to reproduce itself or in other words, to create capital. Labor is the interest underlying all other interests; therefore, it is entitled to and should receive from society and government protection and encouragement.

## **UA Instructors Training Program**

UA ITP had been started in the year 1954. This is an annual training program for instructors, teachers and trainee instructors. Hundreds and thousands of participants come together every year for the program in Ann Arbor, MI in August. For last 30 years the program has been hosted by and at Washtenaw Community College. Convocation for graduates are also been held during the ITP week. Training is given in 70-80 different topics under ITP.

## **The Scholarship**

The scholarship is for plumbing professionals and instructors or teachers or trainee teachers around the world. The winner travels to USA in the month of August to Ann Arbor, Michigan to undertake 40 hours training program called 'Instructors Training Program' organized by United Association. This scholarship offers US\$ 10,000 to cover the expenses for United Association's ITP in Ann Arbor, Michigan, including cost of airfare, local travelling, hotel, food & drinks, sightseeing and incidental expenses. Visit to jobsites, workshops and other plumbing related visits also been arranged.

# Background

I started teaching plumbing to the in-house and also students from different institutions in 2014. After teaching for some time I realized that I must know the methods, procedures and standards of plumbing education in other countries too to evaluate myself and as well as the standards of my country.

At first I started searching in the web-world. I searched and read about the plumbing education in different countries. But that was not enough. Even me, myself was not satisfied by the information I found on net. I need to learn more. I was searching hard but not getting a complete view.

In order to do so I also started exploring how to know the methods and procedure of the plumbing educations in other countries. And when I saw the scholarship program immediately I know this must be the program I was looking for.

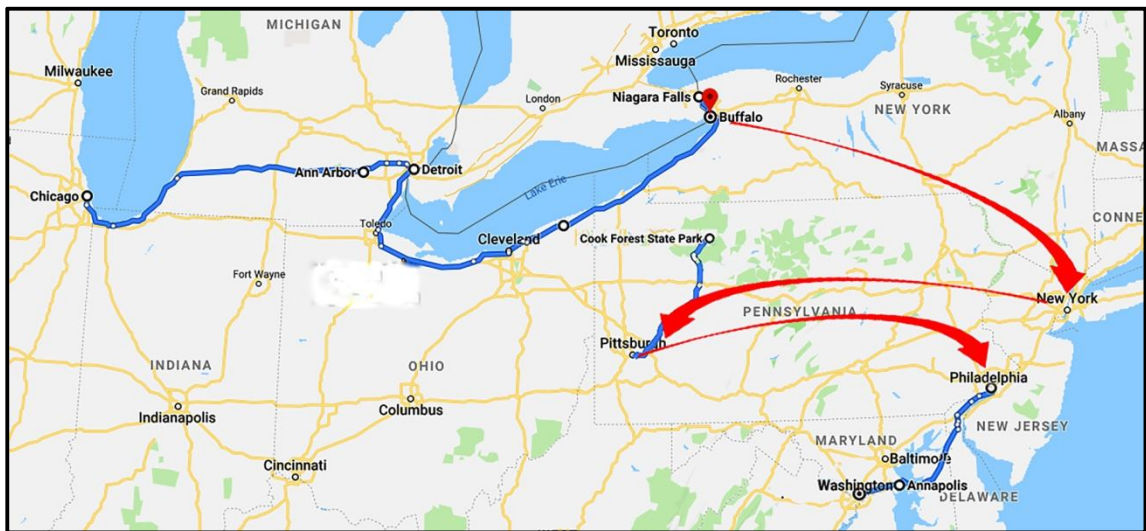
I applied for WPC Education and Training Scholarship in the year 2016 but my effort was not enough. But I did not lose my hope at all, rather I organized myself and in 2018 I applied for the 2<sup>nd</sup> time. This time I was lucky enough to be chosen.

# Report

## THE SCHOLARSHIP PROGRAM

### TRAVELLING TO USA

I flew from Kolkata, India to Chicago (IL), USA with a stopover in Doha, Qatar and the flight was tiring 22 and half hours all together. Thereafter I travelled to Ann Arbor (MI), Detroit (MI), Niagara (NY), Buffalo (NY), New York City (NY), Pittsburgh (PA), Cooks Forest (PA), Philadelphia (PA), Atlantic City (NJ), Arlington (VA) and Washington DC. in my tour of 27 days. Mr Tom Bigley received me at Chicago airport and accompanied me for most of the part of my stay in USA.



*My roadmap in USA. (Blue for road by car and Red for air travel)*

### ITP AT WCC, ANN ARBOR, MI, USA

The main Instructors Training Program was started with the orientation session on 10<sup>th</sup> August, 2019 at Washtenaw Community College, Ann Arbor, Michigan, USA. I had been introduced mentioning as a special guest and I received a very heartiest



welcome and a long ovation from the jam-packed auditorium of the WCC. The



classroom training was held from 11<sup>th</sup> through 16<sup>th</sup> August 2019. Each day were scheduled with 2 sessions of 4 hours each. On 13<sup>th</sup> August we had been taken to the NSF for visiting the testing facilities.

I took two classes (a) 4001 Methods in Teaching Water Supply Systems and (b) 4002 Methods in Teaching Drainage Systems. Both of them were a 20 hours training program.

Mr. John J. Yock Jr. and Mr. Billy Brown both from Plumbers Joint Apprentice Committee Local Union 130 of United Association (Chicago, IL) were our instructor in the Water supply classes whereas Mr. Gary J. Montemarano, Trade Instructor, Trade Education Fund Joint Apprentice and Committee, Local Union 1 of United Association (NYC) was the instructor for the Drainage class.

All the classes were a mixture of PPT driven lecture, discussion and interaction between teacher-students and students-students which made the training more attractive and enjoyable. The interaction part enabled the active participation in the class. In my case the interaction always were based on the comparative nature where the instructors and my fellow classmates took a great interest to know about the rules, codes, practice and scenario in my home country. This scenario may be an added attraction to the teachers and to my fellow classmates to get an idea from a different part of the world and vice-versa.



*In the class with Mr Mark McManus, Gen President, UA (in my right), Mr Tom Bigley, Chairman, WPC & Director of Plumbing, UA (in my left), our instructors Mr. John J. Yock Jr. (2nd from right at rear) and Mr. Billy Brown (4th from right at rear) along with my other classmates.*

During the ITP the showcasing of mobile plumbing training and service vehicles are added attraction. Plumbing competition was also a great idea and must be a matter of enthusiasm for the competing and aspiring plumbing students.



*Plumbing Contestants*



*Teller mounted fire protection showcasing*

## BEYOND ITP

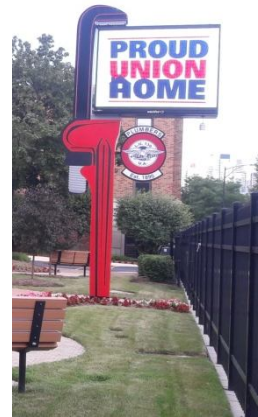
Apart from the training the host had arranged a number of visits to the UA Local Plumbers and Pipefitters Training Centers, Job sites, Offices of different organizations related to the trade and Plumbing and other related workshops which helped me a lot to get an overview of the plumbing world in USA.



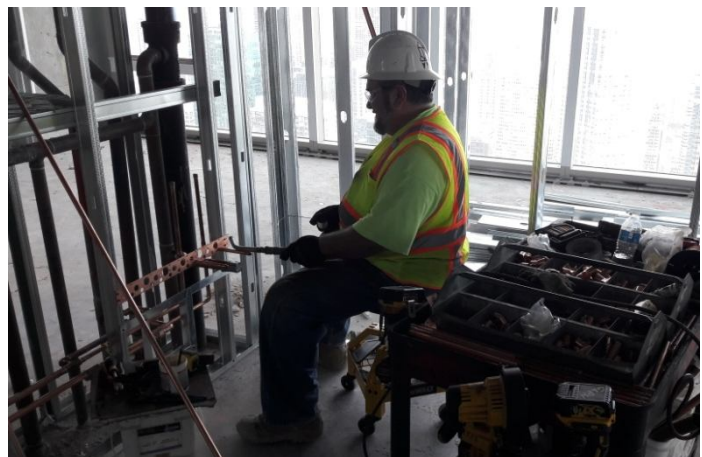
*United Association Head Quarter at Annapolis, MD, USA*

I also got an opportunity to visit United Associations Head Quarter at Annapolis, MD (attached photo) where I received a very warm welcome by the Asst Director, UA Education and Training Mr. Raymond Boyd. The matter of fact is Mr. Boyd received me at Philadelphia and drove me himself to his office at Annapolis. I also visited the offices of American Society of Sanitary Engineers and International Association of Plumbing and Mechanical Officials at Mokena, IL where I met Mr. Dave Viola, Deputy Chairman, WPC, COO and Executive VP, IAPMO. Later on I had been to the Office of Mechanical Contractors Association at Lanham, MD where I met Mr Thomas L Bello and his team who explained their role and coordination with UA in the field of mechanical and plumbing job in USA.

Starting with the UA Local 130 Plumbers Training Center in Chicago I visited one after another naming UA Local 597 Pipefitters Training Center at Mokena, IL, UA Local 27 in Pittsburgh, PA, UA Local 5 at Camp Springs, MD, UA Local 1 in New York City, NY. Everywhere I received a very warm and heartiest welcome and the respective top officials took a great interest and spared their time to give me a visit of their centers and explained and clarified my each and every query with patience and enthusiasm.



With the active cooperation and coordination of Mr Tom Bigley, I was fortunate enough to visit a number of job sites and plumbing shops of the renowned contractors of the area. In Chicago I visited an under construction 101 storied condominium which is one of



the tallest in the city. In Washington DC I had been to the job site of National Aeronautics and Space Museum. The construction team gave us a visit of the working areas including mechanical floors. I also visited job sites in New York City and Philadelphia.



I had also been to the office and shops of a number of plumbing and mechanical contractors where they generously discussed and showed their method of work, sequence etc. followed by fabrication, storage and



transportation facilities. All those visits are unforgettable due to the quality of work, quality of working space and environment, EHS, infrastructure as well as the hospitality of the respective hosts. The way they took great interest and enthusiasm to show their work has really impressed me.

## LEISURE TRAVEL

UA also arranged leisure visits in the spare times and in between the work related visits which was really helped a lot to break the monotony of continuous work. In Chicago I had been taken to the Architectural boat tour where I was able to see the richness of architecture of the city. One afternoon visit to the countryside near Ann Arbor with Mr Tom Bigley was a refreshing one. The top and important tourist attractions like Statue of Liberty and Freedom Tower in New York, Liberty bell and Independence monuments in Philadelphia, National Monument, Lincoln Memorial, Capitol Building and



all other federal buildings around it in Washington DC were also some of them which I must mention. The beautiful city of Buffalo (NY) will be one of the best among the

places I had been in USA. But two most unforgettable memory I had during the visit were in two weekends where in the first I visited Niagara Falls with my childhood friend and in the second my stay with Mr Tom Bigley to his forest cabin in Cooks Forest where an adventurous Kayaking was the first in my life. The hospitality and care taken by Bigley family is unforgettable.



*A night view of Niagara falls, NY.*

## A STUDY : HOME & HOST

### INDIAN CONTEXT

#### THE HOME COUNTRY

**India** (in local language *Bhārat*), located in South Asia, is the seventh largest country with an area of 3,287,263 sq.km (1,269,219 sq mi) and home to more than 1.3 billion people, it is the second most populous country in the world. A pluralistic, multilingual and multi-ethnic society, it is also home to a diversity of wildlife in a variety of protected habitats. Here you can find one of the highest mountain ranges in the world to seas and oceans with an elevation ranging from '0' (MSL) to 8000 metres, a barren landscape to a dense forest. In summer some area experiences a temperature of 50° C in Thar Desert whereas Siachen area records a temperature as -50° C or further low in the winter.

#### THE PLUMBING PRACTICES

The Indian subcontinent was home to the urban Indus Valley Civilization of the 3rd millennium BCE which is the home to the oldest organized and planned sewer system with flush toilets and city sewer system. Though *Harappa* and *Mohenjo Daro* is now in Pakistan after the partition during independence in the year 1947 but both the city was part of the undivided part of India. So plumbing is the subject in practice for centuries in my country. Similar evidences have been found in the ancient town of *Lothal* and *Dholavira* in Gujarat province in the western part of India. The image shows the Acropolis in Lothal (PC: web).





*Sewerage system in Indus valley (PC: web)*

In spite of the fact that India has developed herself with excellence in many field like medical, science & technology, IT and many more but being one of the most densely populated countries in the world a large portion of the Indian youth is either unemployed or engaged in the unorganized sector due to the improper skill levels.

In recent years both the central and the various state governments have taken projects to enhance skill levels of the youths, both for the students under structured education systems as well as school drop-outs.

Students under structured education system receive engineering and vocational degrees through different engineering colleges (Diploma, Bachelor Degree and Master Degrees) and Industrial Training Institutes (Certificate courses). Side by side the governments have structured some program to give skill trainings to the people interested to enhance their skills in various subjects. This skill education programs enable them to work in good organizations or to start their entrepreneurship.

Plumbers in my country are mainly the workforces who are engaged in plumbing installations. For many years, here, in India being a plumber doesn't mean a worker whose skill is enhanced through structured training but a person who has enhanced his skill or has learnt to perform the job either from his parents, relatives or from



another plumber with whom he was working as helper in the past. In recent years the skill training has been structured but the best is yet to come.

## PLUMBING INSTALLATIONS

In India the entire working procedures are mostly on site.

**Planning:** The planning part was taken care, well in advance to ensure the trouble-free further process. The design is done as per the 'National Building Code of India'. Apart from this a number of 'Indian Standard' are available to define and clarify the standards for materials, quality, and working methodology. Stacks can be single or double. Water supply can be gravity flow or pressurized system both. Venting of all traps is not mandatory. For high rise buildings the 'vertical zone' system is in use. STP is mandatory for buildings and projects exceeding certain built-up area.

**Drawing:** The drawing is done through Auto CAD mainly to produce SLDs, shop drawings and 3-D modeling. BIM is in use in some projects too. Other software like 'Revit' is also in use.

**Materials:** Here in India, now days, the piping materials most in use are non-metallic ones. In budget or low cost housings uPVC pipes (IS 13592) and fittings (IS 14735) are commonly used for drainage purposes. For cold water supply lines uPVC as per ASTM D-1785 Schedule-40 and for hot water CPVC as per ASTM D-2846 are common. In high end projects drainage pipes are either Poly-propylene (low noise) or Centrifugally Cast Iron (spigot-socket or hubless). For cold water it may be uPVC as per ASTM D-1785 Schedule-40, Poly-butylenes (PB), CPVC, copper, etc. For hot water it may be CPVC, Poly ethylene Raised temperature (PE-RT), Mineral reinforced multilayer with PE-AL-PE or similar pipes, PEX, GI, copper. For high pressure and main header lines stainless steel pipes are also seen.

For venting it's generally PVC (as per IS-4985 Class-III) internally and uPVC or CCI in the riser shaft.



For external sewerage salt glazed stoneware pipes, RCC Hume pipes, HDPE, Double wall corrugated pipes are common. For water supply, uPVC, GI, PP-R are widely in use.

**Installation:** After the approval of shop drawing the contractor procures the materials and delivers to the site. The fabrications and installations are done on site. In India there are no separate fabrication and installation but both at the same time. After that testing and commissioning is done. In India generally drainage pipes are tested with smoke and water supply pipelines are tested with hydro-pressure test to a pressure 1.5 times the working pressure. External sewer and storm lines are generally undergo flood test.

## US EXPERIENCE

Overall experience as far as the plumbing installation is concerned is not much different from here in India barring a few like stipulations by the prevailing codes mainly in the use of material; more precisely the restriction of non-metallic pipes in high rise buildings. The work quality is also good and that is because of the skill levels of the plumbers. To my opinion the training makes the difference. From the experience of the different UA training centers like Local 1, 5, 27, 130, 597 the overall impression one can have is that those who are associated either as officials or teaching professionals or students are fortunate enough to be associated with one of the best education and training facilities in the world.

## PLUMBING TRAINING & THE UA

The United Association with its 130 years of firm and gigantic presence all over the country and also in some other countries is very much organized and regimented with dedication and commitment towards the industry, trade and society. The association has a presence in United States of America, Canada, Australia and Ireland.

## THE LOCAL TRAINING CENTERS

The local training centers are very impressive in organizing training, placement, meticulously managing infrastructure and finance. Few things those never failed to draw one's attention are as follows;

**Framework:** This is a 5 years course where after 4 years of training they take preparation for the final exam. They can join a job as apprentice after certain procedure and tests from their centers which certifies them 'fit for job'. They work 5 day a week and attend classes either 2 days per week or 1 week per month. This certainly helps many trainees to take forward their studies and they don't have to bother about their financial burden. After 5 years of training and passing the exams they are declared as 'Journeyman' and they are now ready to join take a job under 'Master Plumbers'.

During their training period they learn both theoretical and practical subjects like science, mathematics water supply, drainage installation, heating, backflow preventions, welding supporting systems, maintenance, codes of practice, rain water harvesting, etc. They learn about tools and machineries including their use and maintenance. Safety and housekeeping also part of their training.

**Infrastructure:** All the training centers have a very good infrastructure with building having adequate classrooms, workshops, laboratories, libraries all having a large healthy working space with modern facilities like projectors and screens, public address systems, computers and allied accessories, machineries for hands on training to cover each and



every part of the job. All the centers also are equipped with all amenities like healthy circulation spaces, cafeteria, rest rooms, parking spaces etc. I also have come across a few 'state of an art' machines and equipments. A new machine with virtual reality projection for practicing 'welding' was one of them (see right). This machine is 100% safe for novice welders.

An interactive screen for teaching in the class instead of normal screen was another, which I only have seen in media-houses but never in a training center (Below picture).



*Smart class in a plumbing training centre*

#### **EHS:**

It was also evident that you took care a lot about environment, health and safety as in some of the centers it was found that the recycled and/or rain water has been used for flushing and laboratories to take care of the water conservation. It also had been observed that all the



*Rain water harvesting system at Local 130*

faucets are sensor operated which take care of two things at a time namely, health and environment. The use of proper PPE by the students will make them 'used to' and cautious about the health hazard while working in a jobsite in future.

**Placement:** Once you have a good and proper training you expect and deserve to get the employment. Here also the training centers play a vital role. Each centers have dedicated personnel – 'Business Agent' and 'Business Manager'. Business Managers liaison with the employers and prepares the job-pool for the apprentices and 'journeymen'.

In this field also they are very much organized. Every single center has their own territories and they strictly work within their own jurisdiction. Sometimes there may be shortage of job-seekers or shortage of available job, in such cases the centers seek helps from the adjacent centers and if they have excess jobs or plumbers they help their neighbors. But until and unless the local center asks for either job or a plumber no centers ever steps out of its agreed territorial boundaries.

**Commitment:** It is great to know that the training offered by these centers is free of costs. It is really a great effort and offer to the society to take care so that the youth can get trained and get the employment with a relatively good salary. On the other hand when the plumbers get employment they contribute to the training centers.

**Flexibility:** The flexibility of class timings is of course a huge advantage for the students and apprentices. They can take regular classes or part time classes and continue to a job as apprentice and can take care of their need by earning while studying.

**Finance:** It is obvious to run and maintain a huge facility like that one must need great deal of money. I was curious about the income. I already came to know that they don't take any training fees from the trainees. Mr Raymond Boyd explained me the whole thing; he told me that when the plumbers start earning they give a part of their earning to

the local centers they are enroll with. It was good to know that the members who pay and take care of the financial requirement to run the show. This must be the perfect way to pay back the debt. And once you have it you need to manage the fund properly. It is also impressive that each training centers have their own fund manager who manage the funds and investments to grow further.

## **PLUMBING INSTALLATIONS**

During my stay in USA I was fortunate enough to see the entire working procedures starting from planning, drawing preparations, in-shop fabrication, on site fabrication, installation and testing. Yes I must admit I have only able to see the highrise buildings and got little chance to see the plumbing of small buildings like one story or two storey single family dwelling units. I have seen small bungalows only where I stayed a couple of times, that means completed and occupied buildings but not the under construction stage.

**Planning:** The planning part was taken care, well in advance to ensure the trouble-free further process. Zoning system is popular here also in high rise buildings. The design is done as per Federal code mainly but at the same time local codes are also present in many areas. Unlike in India rain water downtake pipes are insulated because of the extreme cold climate in some part of the year.

**Drawing:** The drawing is done through 'Auto CAD' or Revit. Talking to one of the drawing personnel we came to know that the Auto CAD is commonly in use to produce SLDs, shop drawings and 3-D modeling. Clash detection was done and clash free drawing was produced at this stage. After that the shop drawing was sent to the foreman to decide the split points. After this the drawing is approved for fabrication.

**Materials:**

In USA, as the law enforce, the piping materials most in use are metallic ones. Centrifugally Cast Iron (spigot-socket or hubless) are mostly used for soil, waste, rain water and vents. For smaller waste pipes (32-40-50 mm dia) are mainly copper pipes. For cold and hot water supply it is copper. For high pressure and main header lines stainless steel pipes with coupler joints are been used.

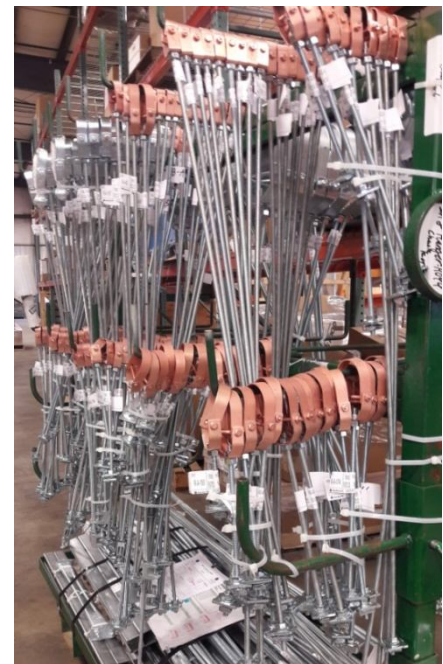


The only place where I have seen non-metallic pipes in a building more than 3 stories are in science laboratories where HDPE pipes with electro-fusion joints are seen. These are to take care of the laboratory sinks for taking care of the acid or corrosive chemical wastes commonly found in science laboratories.



**Fabrication:**

The fabrication is mostly in the shop. This includes the fabrications of the pipelines, equipments and the supports and hangers. Each and every part is marked, labeled, packed or mounted on the trolleys, skids or framed for shipments. The materials are arranged so that the site receives them exactly in the order they need to install. Each shipment is tracked through GPS or similar way to monitor the delivery schedule.





**Installation:** Once the materials are reached at site the foreman take care of the installations with the help of their highly efficient plumbers. In some cases as we saw the plumbers are fabricating and installing on site. After completion of the installations testing is done and if found ok the installation is ready for commissioning.



*Ready for shipping on cart and truck*



*180° Panoramic view of a fabrication shop*

## DISCUSSION

Plumbing now a day is not just fixing pipes and fittings, but far more than that. The changes to the lifestyle have close links to the socio-economic changes. In one hand the need of the professionals and skilled personnel creates job opportunities on the other hand the increasing population growth demands more job opportunities; -the perfect match. But the more sophisticated and modern equipments are in use, more skilled personnel are required for the installations, maintenance and servicing. Now the need of proper training is required to get the skilled personnel. And the skill can be only enhanced through vocational and technical training. Here the scope and need of proper vocational training comes into play.

The rapid changing in the modern world raised a concern too; modernization has given us the comfort but at the same time presented with some problems too. Change in lifestyle has brought a lot of questions to our lives; environment, sustainability and finally existence.

In earlier days the challenge was limitation of available resources. But as the day passed we came up with new materials, new equipment, new method and new technologies. The once called 'bathroom' or 'toilet' is now changed to 'rest rooms'. Even one of the famous sanitary fixture manufacturing brand have mentioned the rest rooms as 'glamour-rooms'. Amenities and comfort with luxury created an eyebrow raising question too, - "how long?" Yes! This is the life threatening question to the modern world "how long our natural resources will be available?" More precisely access to fresh water in future is questionable now. And water is related to everything, to mine any material we need water. To process those materials we need water. To run industry we need water. To run industries we need energy and to produce energy we need water.

One recent study says that in one decade the population explosion we are expecting will need to increase the area of cultivated land equals to the area of Brazil and the total cultivated land required is equal to the entire Latin America. The ground water is vanishing rapidly, so does the natural vegetation. As fast as we are running towards the development we are running faster towards the 'edge'. The climate change is evident. Salinity of ocean water changing, aquifers running out, hole in the ozone



layer, Amazon, which breadth in considerable quantum of carbon dioxide is burning... are we nearing our 'D-day'? We don't have answers.

We are proudly proclaiming our technological advancement. We are announcing our rocket program with pride. Moon and Mars becoming close day by day, but usable water is getting far and far away.

There is the big question. And here the role of the plumber comes. They have to work sensibly. They need to understand the problem of environment. They need to understand the sustainability issue.

Plumbers are those whom the whole society is now looking at. So the need of proper plumbing training comes into the picture. They need to understand the good and bad effect of each piece of work they are doing. They need to learn the optimization in use of materials and resources. They need to know the value of work. At the same time they must work responsibly to preserve water. They are the bridge between the solution and the end-users. End users may not be aware about the 'good's and 'bad's and may be relying on their social habits and practices, but a plumber can make



the necessary 'alterations' to protect the environment without compromising the comfort and believe of the end users. This is not easy job to change the social habits. Here is the necessity of proper plumbing education through which a plumber can make the things possible.

I can give a very small example; even in my house all the members are used to old faucets. But when I got to know about the 'aerator' I immediately changed one of the basin faucets with that. I faced a little resistance at the beginning. But in a few days everyone was used to it. So one by one I changed all faucets and everyone is now happy and I am happy to save 30% water. This is the role of a plumber and this only is possible if we get proper training and education. It is obvious if we need to convince others we have to be confident first, confidence only comes when we know 'pro's and

'corn's of the matter, to know pros & cons we must have vivid knowledge and knowledge comes from education.

Another example I remember is, in my country now lead joints to the cast iron pipes are almost abandoned. Lead is harmful to health. It may contaminate water and ultimately when this water flows into ground or river it contaminates rivers and ground waters. Lead joint has another problem; lead need to heat and melt to apply. While heating we need an open flame which creates safety issue. If proper precaution is not been taken it may cause fire. Also during melting, the worker may inhale fume which is also harmful for health. So if the plumber continues using other cementing material to join cast iron pipes its better for the health for him and end-users, better for environment, health and safety.

Various forms of waterborne diarrheal disease are the most prominent examples, and affect children in developing countries most dramatically. According to the World Health Organization, waterborne diseases account for an estimated about 1.5 million human deaths annually. The World Health Organization estimates 842,000 deaths per year, is attributable to a lack of safe drinking water supply, sanitation and hygiene. The earliest incident recorded is way back to 429 BC in Greece where nearly 100 thousand people died. 1854 AD Broad Street is another incident of Cholera epidemic. A proper plumbing can prevent such incidents. We know back flow prevention is how important now a day.

So it is evident that the proper education is the one that can make the difference. The good and bad are only understandable through proper education. Not only knowing the good and bad is enough, changing the 'bad' into the 'good' must be learnt, otherwise the whole world will cease to exist one day.

## Conclusion

The plumbing in the United States of America has gone a long way in terms of quality of work, quality manpower, training facilities, work value and commitment. The term 'plumber' has grown a respect in USA unlike in most of the developing countries of the world.

I have tried to figure out the secrets behind the success. To my opinion there are many key factors that have contributed to the success;

Firstly, the structured training framework, training facilities along with the infrastructure of the centers have reached to a height that is capable of producing reliable and skilled manpower.

Secondly, the working methodology including planning and coordination, fabrication, shipment, installation, quality control is very much well-planned and controlled. The planning is very much to the micro-level to ensure trouble-free installation of the system.

Thirdly, the skilled manpower must be the product of the first. Their level of knowledge, skill, dedication and sense of responsibility has taken them to another level.

Fourthly, socio-economical standard, buying power has enabled them to afford quality product and craftsmen. The pay package to the plumbers is also considerably 'good' and may be one of the best in the whole world.

Finally, in the whole process, the role of the United Association is very much positive in all fronts. Their organizational structure may be second to none in totality. Their 130 years presence is the proof of their soundness in one hand; in other hand through the journey of this 130 long years must have taught them to deal with every difficulties and challenge. But it must be appreciated that the sustaining throughout the time itself is a challenge which they have dealt well.

So far we have discussed about the glorious side of the plumbing. But there is some darker side too. We all know about the Navajo Mission in New Mexico. The migrating communities with little or no access to proper plumbing make us sorry. We must be agreed that it is difficult to provide good plumbing system to migrating communities. But again the help of the plumbing communities set an example by launching the program like "Community Plumbing Challenge". Next year also there is another edition of CPC in Indonesia. May be the arrangements is not sufficient as a large number of people around the world still don't have the access to safe drinking water and hygienic sanitation facilities not only in the least developed and developing countries but also in developed countries too. These are the stories of the people who are helpless because of their geographical, hydrological or socio-economic reason. But there are people who still don't have running waters in their houses and they don't use modern and safe flush toilets, - not by compulsion but by choice. I have able to visit a community named 'Amish' in Pennsylvania whose lifestyle is quite surprisingly primitive. Due to their self confinement I was unable to dig more to their lifestyle which I was keen to. I am not sure whether it is right or wrong to deny the updated facilities today but apparently they look happy and satisfied, at least they presented themselves so. There are many communities like them around the world.

So the responsibilities of the plumbing community is quite big and we have to work hard till each and every living being is safe and self sufficient as far as the plumbing and sanitation is concerned.

Hence, till we have even a single child death due to safe drinking water, till the last man has no-access to safe drinking water and proper sanitation system we, the plumbing community will have to bear the pain of helplessness. So let's come together, ignoring the geographical, cultural, religious boundaries to fight hand in hand to end the plumbing poverty and walk towards a glorious tomorrow.

# My Schol arship Cal endar

---

1 <sup>st</sup> June 2018		WPC Notification
22 <sup>nd</sup> September 2018		Application mail sent
26 <sup>th</sup> November 2018		Recipient mail received
27 <sup>th</sup> – 30 <sup>th</sup> November 2018		Initial Documentations
10 <sup>th</sup> December 2018		Submission of Itinerary and Budget
15 <sup>th</sup> March 2019		Travel documents (Visa and Air Tickets)
6 <sup>th</sup> August 2019		Leaving Kolkata
		Arrival in Chicago and received by Mr Thomas G. Bigley, (then, Deputy Chair) Chairman, WPC and Director of Plumbing, UA
7 <sup>th</sup> August 2019		Visit to a 101 storied building
		Visit to Local Plumbing Training Centre 130
8 <sup>th</sup> August 2019		Went on the Architectural Boat Tour of Chicago
		Visit to Local Pipefitters Training Centre 597
		Visit to office of ASSE and IAPMO
9 <sup>th</sup> August 2019		Reached Ann Arbor, MI
		To Detroit Tigers' Baseball Game
10 <sup>th</sup> August 2019		Registration & Orientation
11 <sup>th</sup> – 12 <sup>th</sup> August 2019		0800 – 1700 hrs : ITP
13 <sup>th</sup> August 2019		Visit to NSF
14 <sup>th</sup> August 2019		Industry Day Celebration: Presentation ceremony of WPC Scholarship Medal and UA Plaque
15 <sup>th</sup> August 2019		0800 – 1200 hrs : ITP followed by Graduation
		Afternoon Leisure travel to nearby countrysides
16 <sup>th</sup> August 2019		0700 – 1100 hrs : Final session of ITP
		Transferred to Detroit to spend the weekend with one of my childhood friends and classmates.

---

---

17 <sup>th</sup> & 18 <sup>th</sup> August 2019	Visiting Niagara Falls and nearby vineyards and wineries.
19 <sup>th</sup> August 2019	To Buffalo to visit plumbing shop
20 <sup>th</sup> August 2019	To New York
21 <sup>st</sup> August 2019	Visit to UA office and Local 1 training center
22 <sup>nd</sup> August 2019	Visit to NYC Water treatment plant at Bronx   Visit to major tourist attractions of the city including Statue of Liberty and Ground Zero
23 <sup>rd</sup> August 2019	To Pittsburgh, PA, visit to UA Local 27   Transfer to Cooks Forest
24 <sup>th</sup> & 25 <sup>th</sup> August 2019	Leisure with Amish Country Tour, Kayaking, Hiking with excellent hospitality from Mrs. Kathey Bigley and Mr. Tom Bigley
26 <sup>th</sup> August 2019	To Philadelphia, PA and visit to Plumbing shop.   Leisure trip to major tourist attractions of the city.
27 <sup>th</sup> August 2019	Leisure trip to Atlantic City, NJ
28 <sup>th</sup> August 2019	To Washington DC
28 <sup>th</sup> August 2019	Visit to National Aeronautics & Space Museum job site   Leisure visit to important national monuments and federal buildings
30 <sup>th</sup> August 2019	Departed from Washington DC
1 <sup>st</sup> September 2019	Returned to Kolkata, India
30 <sup>th</sup> September 2019	Preparation and Submission of Executive Summery
31 <sup>st</sup> October 2019	Preparation and Submission of Full Report

# Acknowledgement



The author is indebted and expressing his sincere gratitude to

***World Plumbing Council***

**&**

***United Association***

for awarding, organizing, arranging and sponsoring the training  
and related visits.

The author is also indebted and expressing his sincere gratitude to...

*Mr D. K. Roychoudhury, MD, Sanitary Syndicate Pvt Ltd*

*Mr Ramaprasun Mitra, Director, Sanitary Syndicate Pvt Ltd*

*Mr S. K. Roychoudhury, Director, Sanitary Syndicate Pvt Ltd*

*Prof Dr Asis Mazumdar, Director, SOWRE, Jadavpur University, Chairman, IPA  
Kolkata Chapter*

*Mr Shane La Combre, Ex Chairman, WPC*

*Mr Thomas G Bigley, Chairman, WPC, Director of Plumbing, UA*

*Mr Mark McManus, General President, UA*

*Mr James Pavesic, Director, Education and Training, UA*

*Mr Raymond Boyd, Asst Director, UA Education and Training*

*Mr Dave Viola, Executive Board Member, WPC, COO & Exec Director, IAPMO*

*Indian Plumbing Association HQ & Kolkata Chapter*

*International Association for Plumbing and Mechanical Officials*

*My colleagues at Sanitary Syndicate Pvt Ltd*

*Washtenaw Community College, Ann Arbor, MI*

*Mr Subhash Deshpande, Former (Retd.) Director, IAPMO*

*Mr. John J. Yock Jr., Plumbers Joint Apprentice Committee, UA Local 130*

*Mr. Billy Brown, Plumbers Joint Apprentice Committee, UA Local 130*

*Mr. Gary J. Montemarano, Trade Instructor, UA Local 1*

The author also expresses his sincere thanks to all those accompanied him,  
helped him and guided him all the way during his visit...

*Ms Kathy Bigley | Prabir Sil, Detroit, MI, USA | Ms Emily Hardwick, Secretary,  
WPC | Louis Pasquale, UA Local 1 | Mr George Malandrakis, Business Agent, UA  
Local 1 | Mr Kevin Dean, Business Agent, UA Local 690 | Mr Jim Friel, Business  
Agent, UA Local 690 | Mr J L Lou Spencer, Business Agent / Organiser, UA Local 5 |  
Mr Sean Reddon, Business Manager, UA Local 22 | Mr Pat McCarthy, Business  
Agent, UA Local 130 | Mr James Coyne, Business Manager, UA Local 130*

The author also expressing his sincere gratitude to all those whose hospitality  
enabled his travel and stay a comfortable one...

*Club 7 and Mr Joseph Dias | Qatar Airways | Delta Airlines | American Airlines |  
Carey Limo Service | Hyatt House, Chicago | Webbers Inn, Ann Arbor | Hyatt  
Palace, Niagara | Embassy Suit by Hilton, Buffalo | Springhill Suites Marriott, New  
York | Radisson Hotel, Philadelphia, PA | Hampton Inn & Suits by Hilton,  
Washington DC | Destination Ann Arbor*

//

### **Special thanks to...**

my family members, my mother Ms **Snighdha** Das, my wife **Sumita**, my daughter **Suneha**, sister and brother in law **Swarnali** and **Pankaj** Laha and my niece **Poushali** for their continuous support, help and encouragement at the same time for their sacrifice in terms of my absence due to my engagement in plumbing.

//

# Executive Summery

I left India on 6<sup>th</sup> August 2019 from Kolkata through Qatar Airways and reached Chicago, IL at afternoon where I received a very warm welcome by Mr Tom Bigley, Deputy Chairman, WPC & Plumbing Director, UA.

Next 2 days we visited one 101 storied tall sky scrapper and 2 training centers Local 130 and 597 both were excellent in all departments. I also had been to an architectural boat tour in Chicago.

On 9<sup>th</sup> August we drove to Ann Arbor.

On 10<sup>th</sup> we visited Washtenaw Community College for registration and orientation. During orientation I received very warm welcome when Mr Raymond Boyd, Asst Director, UA Education and Training, introduced me as 'special guest' to the jam-packed auditorium.

From 11<sup>th</sup> to 16<sup>th</sup> August I took 2 classes, Method of teaching Water supply and Method of teaching Drainage. The classes were held from 8 am to 5 pm everyday with a lunch break from 12:05 to 1 o'clock in the afternoon.

On 12<sup>th</sup> we had a block party where a live band performed for the all 3000 participants. It was a fun with lot of music, dance, food and drinks.

On 13<sup>th</sup> morning we were been taken to visit NSF testing facilities where we saw some live testing procedures.

14<sup>th</sup> August is the Industry day and a large numbers of plumbing professionals, contractors and other dignitaries met in the WCC auditorium. Here I received WPC Scholarship medal from Mr Tom Bigley, Deputy Chair, WPC and UA Scholarship Plaque from UA General President Mr Mark McManus. This was the huge moment for me. I handed over Indian and Indian Plumbing Association flag to WPC and UA as souvenir.

On 15<sup>th</sup> August we have only 1 half of class as the 2<sup>nd</sup> half was graduation day. After my class and lunch Tom drove me to the beautiful countryside around Ann Arbor.

On 16<sup>th</sup> our ITP ended after morning session. Tom and me left Ann Arbor and drove to Detroit and dropped me in one of my friends office. Next morning we went to Niagara. Next 2 days I enjoyed Niagara falls in every possible way. I went on Maid of the Mist and Cave of the winds enjoyed fireworks etc.

On 19<sup>th</sup> Tom picked me up from the Niagara hotel and drove to Buffalo to visit one of the biggest mechanical contractor's shop followed by a jobsite in the science college. It was a great experience seeing the enormity of the establishment and methodology of work. In the afternoon we enjoyed the less explored part of Buffalo architecture.

On 20<sup>th</sup> after exploring Buffalo architecture again for sometimes Tom dropped me at Buffalo airport from where I took the flight to New York. And in the evening I landed in a big city with huge crowd which was a total contrast to my quite morning in Buffalo.

Next morning Louis Pasquale, UA Local 1 received me and took to Local 1 office and training center.

On 22<sup>nd</sup> August, Mr George Malandrakis, of UA Local 5 received me and took me to a sky scrapper job site and then to the Water Treatment Plant of NYC. Thereafter he showed me the important tourist attraction in New York including Freedom Tower, Ground Zero and Statue of Liberty.

On 23<sup>rd</sup> I took the morning flight and arrived at Pittsburgh where I was received by Tom along with his wife Kathy. The first stop was at Local 27 training center. Tom gave me a visit to the facilities of the training center.

After lunch we drove to his cabin in Cooks Forest for the weekend where we had a lot of fun with kayaking, hiking and wondering in the woods. He also arranged a tour with Simple Life Amish Tour Company who took us off the beaten path to the real Amish farms and businesses located in New Wilmington and Volant, PA.

On 26<sup>th</sup> Tom bid a good bye for the last time for this trip and we parted after a heartiest hug at Pittsburgh airport from where I flew to Philadelphia where I was received by two of the enthusiastic local agents of Local 690 Jim Friel and Kevin Dean. We paid a visit to Herman Goldner Co. Inc. and able to see their drawing, modeling sections and fabrication shops. Then Jimmy and Kevin showed me all the important and historical places like Liberty Bell, Independence Hall and many more. Next day they took me to Atlantic City.

On 28<sup>th</sup> morning Mr Raymond Boyd received me in the early morning and drove me to UA Head Quarter at Annapolis. Mr Lou Spencer received me there and drove me to UA Local 5 training centers and then fabrication shops of Bower (a mechanical contractor) in Washington DC. He also took me to the office of MCA where they explained me about their role in mechanical jobs. Also they explained their relationship and understanding with UA which I felt both are very positive in their approaches.

Next morning Lou picked me in the morning and went to the job site of National Aeronautic and Space Museum which is under renovation now. I was lucky enough to see such an important job site. I also visited the office of META Engineers P.C. in Arlington, VA and exchanged our experience of building industries in our respective home countries.

Later on the day I visited famous and important tourist attractions in the capital city including National Monument, Lincoln Memorial, Capitol Building, US Congress Library, White House, Supreme Court and many more.

On 30<sup>th</sup> August, after a lazy morning I checked out of my National Harbor hotel for Washington Dallas Airport to bid a final goodbye to USA for the scholarship program.

It was altogether a great experience for me. The enormous magnitude of United Association with their training facilities, dedicated members and employees, network, planning and financial management is noticeably excellent. The quality of the training and dedication reflected in the job sites with neat n clean



fabrications and installations. The mechanical contractors are also very well planned in their jobs which ultimately producing quality end-products. And finally the hospitality and heartiest welcome that I received from everyone I met there are the memories I carried back to my home and will remain forever. I must mention about Mr Tom Bigley for his hospitality, company and guidance without that my tour wouldn't be as smooth and enjoyable as it was.

Thank you World Plumbing Council – Thank you United Association. And of course I am grateful to Indian Plumbing Association and Sanitary Syndicate for giving me the opportunity to be there.

| End of Summery |

# My US Al bum



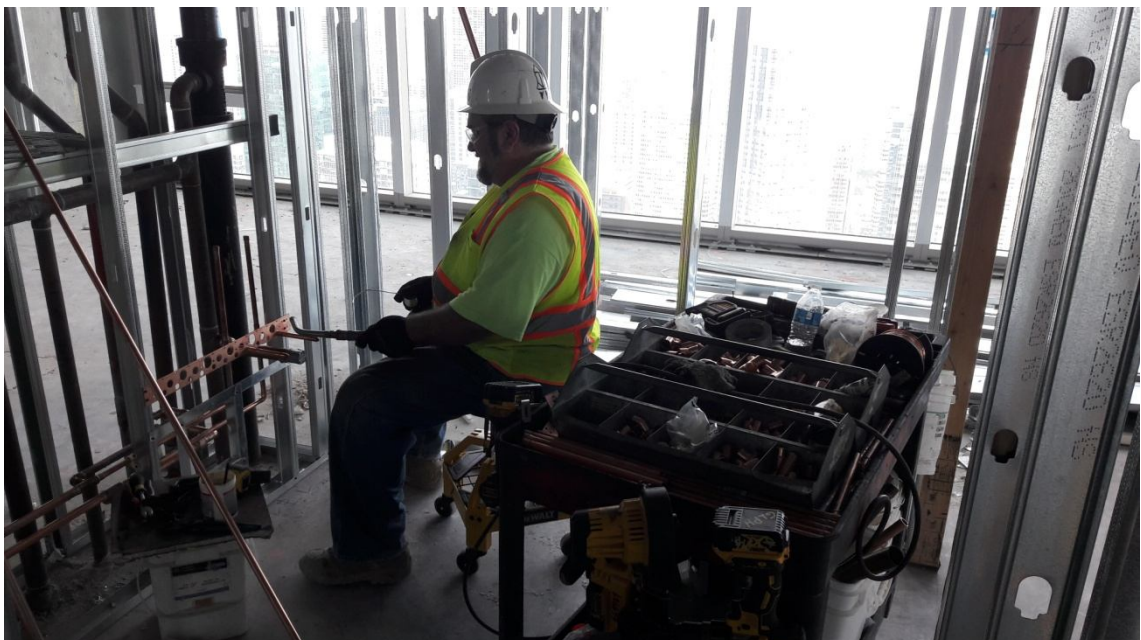
*Handing over Indian Plumbing Association souvenir to UA General President Mr Mark McManus.  
Ann Arbor, MI (PC: Dean Battaglia)*



*Handing over Indian Plumbing Association souvenir to WPC Chairman & UA Director of Plumbing Mr  
Thomas G. Bigley, Ann Arbor, MI. (PC: Dean Battaglia)*

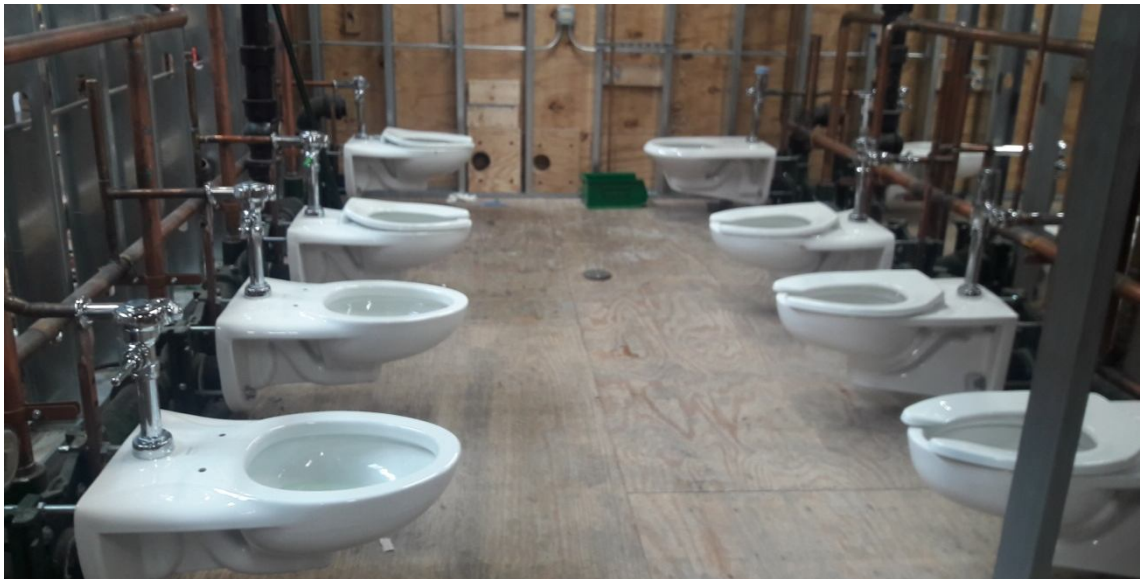


*On top of 101 storied tall 'Wonder Vista' with Local 130 representative and project team. Chicago, IL.*



*A plumber working at a building.*





*Practical Lab in a Training Center*



*Author with the UA Local 597 Training Director Mr Monte Kimes, Mokena, IL*



*Fabrication shop of Danforth at Buffalo, NY*



*Inside Local 27 Training Center at Pittsburgh, PA*



*Chicago*





*A beautiful reflective glass facade building in Chicago*



*Washtenaw Community College, Ann Arbor, Michigan*



*Live band at Block party on the honour of ITP in Ann Arbor*



*A painter with her canvas capturing the Downtown Detroit at the riverwalk.*





*Niagara in the afternoon*



*Niagara at night*



*Rich Architecture of Buffalo, NY*





*New York City from the top*



*New York City Skyline*



*The Statue of Liberty*





*A view of Pittsburgh City, Pennsylvania*



*A landscape on the way to Cook's Forest, PA*





*An Amish Village near Wilmington, PA*



*With Kathy & Tom – my wonderful host in their Cooks Forest Cabin*



*Lincoln Memorial, Washington DC*



*Capitol Building, Washington DC*



*Capitol Building, Washington DC*





*Supreme Court of USA, Washington DC*



*Beautiful Chelsea, MI*



# Reference

## Reference

1. *Google website*
2. *Wikipedia*
3. *Science Daily*
4. *Harappa.com*
5. *Health and Sanitation – (www.indus-valey-civ.weebly.com)*

**Photography : by Author**

Thank you