

## World Plumbing Council Education and Training Scholarship 2016

Visit to Switzerland, Germany and Prague

7-24 July, 2017 Under Report by



Dr. Nitin M. Mohite

Assistant Professor, Civil Engineering Department College of Engineering Pune, Maharashtra State, India. Plumbing Laboratory In-Charge, COEP, Pune Executive Committee Member –Indian Plumbing Association, Pune Chapter Gandh – 4, Rectors Quarters, Hostel Campus, College of Engineering Pune Shivaji Nagar PUNE – 411 005. mobile number: 9552630232 E: nitinmohite265@gmail.com



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## **1 Objective:**

My objective was to visit the Switzerland and other European countries because of the advanced and novel technologies are used in Plumbing and sanitation domain. The latest plumbing technologies from modern high rise building promoting pre-plumb systems, water efficient fixtures are used.

To visit the good and sophisticated training institutes in Switzerland and other European countries to study their curriculum, methodology of teaching, duration of course, minimum qualification

To get advance knowledge in plumbing that will benefit me as a faculty in College of Engineering Pune (COEP) in commencing plumbers training school.

### **2 Introduction:**

My Name is Dr. Nitin M. Mohite, Assistant Professor in Civil Engineering Department, College of Engineering, Pune, Maharashtra State, India. I am also teaching plumbing services elective to final year B. Tech, Civil Engineering Students. I am in-charge of the plumbing lab at COEP. Every year many Architectural, Civil Engineering, Interior Designers, students and faculty, Professionals, contractors, Military Engineers, ITI students and Plumbers visit plumbing lab. As an in-charge of Plumbing laboratory, I conduct lecture in classroom followed by plumbing lab tour. Also the various courses based on the Uniform Illustrated Plumbing Code- India (UIPCI) are conducted for the Civil, Mechanical and Architectural professionals and students. Also proved a certificate training to the plumbers.

### India

At present in India many training institutes are available to provide a vocational training to the students. These institutes are called Industrial training institute (ITI). They are having different curriculum and customize progamme designed to meet specific needs. There is no uniform training course for the plumbing professionals available.

About 90% of the plumbing industry workforce in India is not professionally trained. most of the skill learning in the industry happens through unstructured, on-the job training (ojt). Lack of professionally trained plumbers is a major drawback for country's construction and related sector. To understand the greater need the Government of India Started, the Indian Plumbing

Sector Skill Council (IPSC), under the umbrella of National Skill Development and Entrepreneurship (NSDE). The IPSC will endeavor to address these issues and bring the skill levels in our country to world standards

Indian Plumbing Association (IPA) is a voluntary organization of plumbing professionals, having more than 2500 members across the country from every segment of the building industry including Consultancy, Manufacturing, Contracting, Trading, Academia and Architecture. IPA is to promote advancement of plumbing services in the country by organising Seminars, Exhibitions, Symposiums to educate members of the trade and general public. It also provide a platform for dissemination of information and exchange of ideas on matters related to the plumbing profession and establishing harmonious means of communications to facilitate better interface between the Plumbing Community, Government/ Quasi government agencies, Statutory bodies, NGOs and Private Agencies.

IPA is committed to propagation of training and education in plumbing. For this purpose IPA establish a charitable trust "Indian Institute of Plumbing" (IIP). IIP is dedicated to promoting Vocational Training Courses on various platforms.

### 3.0 Plumbing Education in India, Germany and Switzerland.

To understand the plumbing education framework in India and European countries like Switzerland and Germany, I visited two plumbing schools, First is Rober BOSCH vocational training School, Dortmunt, Germany and second is Werstatt vocational training School in Rapperswill, Switzerland. In the technical training of personnel instruments and tools plays important role. I visited the company Schreiner Didaktik , which manufactures plumbing and sanitary equipments. The company provides various technical teaching equipment required for the plumbing schools. These equipments are very handy and various experiments can be carryout. This company also provides hands on training to aspiring candidates.

To understand the plumbing educational framework of European countries following criteria's are considered and comparative analysis is carried out.

A general comparative analysis of the plumbing regulatory and educational frameworks in Switzerland and in India. In the following table the general comparison of the plumbing education in carried out.

Education Framework in Switzerland Germany / India					
	Switzerland	India			
Minimum Age limit:	16-24	16			
Minimum Qualification for Plumber:	High School	High school (10th)			
Duration of Course:	3-4 years	3 years			
Timing (Full time, Part- time ( Morning/ Evening, Saturday and Sunday)	Part time	Full time			
	(4 days in company, 01 day in school	Full time in house			
Curriculum :	Yes	Yes			
Certified Private Training Institutes or Government Recognized Institute:	recognized by plumbing organization	Government recognized			
Hands on experience or internship:	Yes in company, sites etc	In house			
Training of Plumbing Apprentices for selection and identification of products and material in internal plumbing services:	Yes	No			
Examination and Certification:	Every year twice examination	Every year			
Validation of Certificate:	Yes	Yes			
Process of renewal of Certificate or re-examination	No	No			
Any entrance examination to be conducted ( every year, twice or thrice a year etc)	No	Yes			
Career progression from craft to degree qualification:	Yes	Yes			
Arrangement for continuing professional Development in the Plumbing Industry.	Yes	Yes			

During the discussion with the trainer of both the schools in Germany and Switzerland, it is observed that the each class is having strength of 15 to 25 students.

The average age of the students is 16 to 24 years. The students take admission after their schooling. There is no fee for the students.

The students are sponsored by company and they also get stipend during these year. For the first and second year of the school students work 2 days in company and 3 days in school. In the third and final year students come to school for 1 day and remaining days, he works with the company. During his 4 years, company will provide stipend to the students. The student will get the field experience during his stay in company and the theoretical knowledge is given in the school

The syllabus consists of water technologies, heating and ventilation, environmental and solar techniques. Apart from the plumbing, syllabus consists of other subjects like English communication skills, soft skills, mathematics, economics, Business, Politics, grammar, symbol understanding, understanding of drawings and sports. Due to these course the overall development of student is achieved.

The examination is conducted twice a year. The examination consists of theory as well as practicals. In the theory examination the questions are divided in three class i.e. Business, Planning and Analysis. The 40 % weightage is given to the planning and analysis each and 20 % weightage is given to business.

Examination consist of working with different pipe material, i.e. copper, iron, multilayer pipes, pex pipes etc. their cutting, fitting methodology.

During the examination following taks are givne to the students

Free wall preparation, Noice installationgs, installation of toilet and wasbasin installation of different pipe systems, toilets, washbasin, urinals etc. The maintenance of plubming istallations is also given to the students as a part of examination.

During the examination following skills of students were observed

How do they work?

How they treat the material ?

How the material looks after treatment and its finishing? and soft welding, measurement skills, pressure tests etc are also tested.

The grades are given to the students in the range of 1 to 6, if studet will get more than 4 he will get the certificate of plumbing otherwise he will fail and re appear for the examination. Students gets two attempts only. If he can not clear the examination, he will remain helper forever.

In the practical examination students will identify the faults, and repair in the plumbing assembly or the new plumbing assembly is prepared based on the drawings given. In the final year more weightage is given to the practical examination

The examiners are invited from the company or from other plumbing training institute. They are designated as master plumbers.

After completion of the certificate programme. The young plumber will get 1200 to 1300 Euro per month. The salary will increases as his experience will get increased. The maximum salary is 2000 Euro Per month.

If students fails, he is allowed to appear for the re-examination. But student will not allow more than 2 attempts. If he is not clear the exam, he is de-bar from the school and he will not appear for the course.

The psychological support is also offered by the training institutes to all candidates.

## **3.1 Career progress of student:**

To get Master Plumber's designation, student must work for 5 years in a company. After completion of his 5 years experience in a company he will again apply for the 1 year full time master plumbers course or 3 year part time. The fee for the master plumber course is 10000 Euro.

After completion of Master Plumber the students will start his own company and start doing the business under his leadership. He may further increase his qualification by giving examination to become a engineer.

### **Rober BOSCH Vocational Training School, Dortmund, Germany**



Plumbing classroom, Rober BoSCH Vocational Training School, Dortmunt, Germany



Mr. Busch, Master Trainer, Rober BoSCH Vocational Training School, Dortmunt, Germany



Cut section of Multistage pump.



### Visit to Werkstaktt School of Plumbing, at Rapperswil, Switzerland.

Mr. Peter Stucki, Eidg, Dipl, Sanitarinstallateur, he has master degree in plumbing and having additional 2 year study spcifically on the water supply and drainage.



With Mr. Peter Stucki, Werstatt vocational training School in Rapperswill, Switzerland.





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Sauberkeit / Vollstän	digkeit / Darstellung	1	10	4.0	4
Maximale Punktzahl: 2	0				10
Bewertung der Lerndoku	UK 1 mentation (im ÜK grarbeitete)		7.0		4.0
Ergebnis			1.0		3.5
					-+.0

#### Schreiner DIDAKTIK, Remscheid, Germany Mr. Tim Hankel: is supply technician Mr. Wolfgan Schreiner Location: Remscheid

The Schreiner Didaktik is a plumbing and sanitary equipment manufacturing company. The company provides various technical teaching equipment required for the plumbing schools. These equipments are very handy and carryout various experiments. The equipments like

1) Modular kit Drinking water installation, Mounted on trolley

2) Training station drinking water protection -legionella privation and domestic water supply Training station solar system, tube collector and flat plate collector etc

The main objective to visit this company to see the working models of plumbing and sanitary equipment. How the training is to provided. The number of training modules in sanitary-heating and air condition, the training facility. These equipments are required to train the students in my institute.

The well set in manufacturing and assembly facility is available. The variety of equipments related to plumbing and sanitation modules are available. These modules are on bench so that it gives flexibility and freedom to carryout various experiments. Following are the photographs of equipments.



With Mr. Wolfgan Schreiner and Mr. Tim Hankel, Schreiner DIDAKTIK, Remscheid, Germany



Model kit electronic sanitary control and training station drinking water protection - Legionella Prevention and Domestic Water Supply



Training station solar system, flat plate collector.

### 4.0 Product Approval, testing and Certification

To understand the product approval, testing and certification, I visited various factories i.e. ACO, factory at Brono, Prague, GEBERIT, Rapperswill, Switzerland, George Fischer, schaffhausen and Sissach, Switzeland. The GEBERIT and George Fischer having their State-of - the-Art training facility. The purpose-built Training Academy offers customers free training modules covering the full breadth of the company's product ranges. The facility enables merchant staff to benefit from hands-on training with the latest piping systems and sanitary solutions, whilst the showroom and training facilities offer space and technical information in abundance.

### Visit to ACO factory at Brono, Prague, Mr. Martin, Mr. Pravel Hermanek and Mr. Stanislav Tejkal,

This company is engaged in manufacturing of material and to ensure safe food and adequate sanitation protocols. Equipments for the processing and handling food product must be designed, fabricated, constructed, and installed according to sound hygienic design principle. The company gives more attention on these aspects. Process of cutting, forming and welding will introduce impurities into the surface of the material which can cause the corrosion. Gratings for hygienic channels and Gratings for gullies and slot tops are manufactured by this company. This company test the material in 'in-house' laboratory, the material further is sent to European Hygienic Egnineering Group (EHEDG), labs for certification. The principal goal of EHEDG is the promotion of safe food by improving hygienic engineering and design in all aspects of food manufacture.

The main objective to visit ACO is to see the various product used in food processing industries .These are used interrelated to the. The product manufactured is well tested and by the various agencies line European hygienic engineering and design group (EHEDG) used for the of required for the food and beverage industries are.

EN 1253 -2 standard in development Gullies for buildings Part:2 Roof drains and floor gullies without trap

EN 12056 Gravity drainage system inside building.



Vist to ACO Factory at Brono, Pargue



Mr. Martin, Mr. Pravel Hermanek & Mr. Stanislav Tejkal.

### Visit to Morvia Milk Processing Industries in Brono, Prague



Visit to Moravia Milk Processing industri in Brono, Pargue

### **GEBERIT t Rapperswill** Mr. Abdullaha Oengueren, Head Basic Sanitation Technologies Head, GEBERIT

Visited basic sanitory technoloies labrotary at GEBERIT. The new products are designed and the varios tests are carriout inintion in in-house labrotary. The atomated testing facility carriedout varios tests on durability of various products and their accerrious. Mr. Abullaha is head of basin sanitation technologies hea



The flushing performance test

Toilet test, test material wood, dust place on toilet surface and flush see the how many portion of toilet is cleaned.

30 meter tower consist of waste water drainage system, rainwater drainage system and the syphonic drainage system.

The single foor and any floor system testing is carried out, also the testing is carried out for the entire system.



Pre-plumbing system.





#### **Durability testing lab at GEBERIT**

The various durability tests were carried out in this lab ie flush test, flushing valve test, flush tank test, faucets etc

Pipe testing is also carried out in this lab as per the EN norms. The pressure test, temperature fatigue test is carried out at 10 bar.

Once thes tests are satisfied at GEBRITE lab, the product is send to the certified agencies like SVGW, DVGW

http://www.waterfiltrationsandiego.com/why-choose-pelican/understanding-dvgw-certification

**DVGW** CERT GmbH is the largest gas and water industry **certification** body in Europe, covering all the testing aspects.

The DVGW is an organization that establishes standards and test protocols. It also approves or certifies laboratories to then conduct testing according to those standards and protocols. The same can be said for NSF in the US.

The DVGW is located in Bonn, Germany. It has its own laboratory by the name of TZW located in Karlruhe, Germany. Beyond that, the DVGW has certified some twenty plus privately owned laboratories throughout central Europe who are authorized to conduct certification testing. The same holds true for NSF. It has its own laboratory and those certified by NSF like WQA, UL and Pace Laboratories to name a few.

The DVGW also issues test marks or certifications (i.e. the WQA equivalent of a "Gold Seal") like the "W510" standard. Their internal code for the W510 certification is "9191 – Kalkschutzanlage" (scale protection device). In order to obtain the W510 certification seal or certification mark, the applicant has to pass a total of three test protocols: Efficacy (W512), material safety and structural integrity.

The SVGW and SSIGE water certification body certifies and control the installation parts such as valves, appliances etc drinking water facilities, hygienic, hydraulic, mechanical and physical. If the minimum requirements defined according to the state of the art are met, the water conformity mark is granted.

SVGW is the national umbrella organization of water supply companies. With its codes of practice, advocacy, education and training, its consulting services and the certification of products, companies and personnel SVGW significantly contributes to the reliable supply of the Swiss population with drinking water.

The GEBERIT having training facilely at Rapperswill. The famous two-storey installation tower certainly left its mark. The two storey tower is under maintenance, when I visited the facilities,. With a balcony view, visitors can witness good and bad plumbing practices – all controlled via an app (what isn't these days?) of course. But during my visit the tower is under maintenance.

### **George Fischer**

Mr. Michael Ries, Mr. Jurgen Harsh, Mr. Martin Reinhart

#### **Training facility at George Fisher**



The GF having training facilely at Schaffhausen and Sissach. it demonstrates various products and hands on training is also provided to the visitors. The new product is initingal tested in inhouse lab. The product certification and approval in GF. If we start with a new product we have to do a type test (by an accreditated test house). If this test is successful and we receive an product approval (DVGW), then we have every half year (for systems) / every two years (for valves) a surveillance audit in the mentioned plant(s), this of course from an accred. test house as well). And the third "pillar" is the self-controlling during the production of the product. So there for we have to show this datas during the surveillance audits to the test lab.

So that means if all three "pillars" are okay, the DVGW approval is valid until the expired date. And if necessary (decision form the Product management and the GF sells company in the different countries) we can renew the product approval.

The material which comes in contact with the drinking water, the hygen parts of that particular products need to be checked form the certified agencies. It is very important process. The raw material supplyed by vender is also to be certified from the agencies.



Training facility at GF++



Training facility at GF++

#### **Test and Approval Procedure**



Test and approval flow chart at GF

#### URIMAT

Waterless Urinals are manufactured by the Urimate. These urinals ensure an oder free bathroom experience. The urinals are made up of high quality materia, of polycarbonate . The production process, there is zero-waste rate is achieved. with light weight of the product, sages CO<sup>2</sup> during the transportation. All the material are recyclable, hence these water less urinals are more environmentally friendly than any other Urinals in use today. The various parts of these urinals are certified by various agencies. The mechanical trap used in waterless urinals was certified by IAPMO. The Uniform Plumbing Code (UPC) and National Plumbing code of Canada. Similarly the other certified agencies like TUV certifies other parameters. The certificates are given below









MB-Active Trap

### IAPMO RESEARCH AND TESTING, INC.

5001 East Philadelphia Street, Ontano, California 91761-2816 - USA - 905-472-4100 - 909-472-4244 - www.iapmont.org



# **CERTIFICATE OF LISTING**

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**IAPMO** 

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im Colleng Chairman, Product Certification Committee

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CLO, The MPMC Group

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**IAPMO** Certificates

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**Swiss Qulilty Cerificates** 

#### Produkte Products

# A TÜVRheinland\*

Prüfbericht-Nr.: Test Report No.:	21255569 001	Auftrags-Nr.: Order No.:	3188843-30-1	1 Seite 1 vo Page 1
Kunden-Referenz-Nr.: Olient Reference No.:	24068060	Auftragsdatum: Order date:	21.07.2016	
Auftraggeber: Client:	URIMAT Schweiz AG, Felds Harr Marcel Näpfin	achstr. 81, CH-8714	Felcbach,	
Prüfgegenstand: Test item:	Wasserloses Urinal URIMAT Wasserloses Urinal URIMAT	ecoline, ceramic we sco, weiß, Andebot	niß Nr.: 2061094 w	xm 08.06 2016
Bezeichnung / Typ-Nr.: Identification / Type No.:	Wesserioses Urinal URIMAT Wasserioses Urinal URIMAT	ecoline, ceramic we eco, weiß, Arlike-N	iiů, Arlikel-Nr.: 1 r.: 15.001, Kuns	2.201 Istoff (Polycarhore
Auftrags-Inhal(; Order content:	Mikrobiologische Prüfung / N	licrobiological test		( <u> </u> )
Prtifigrundlage:	DIN EN 1672-2		1.11. <u>2007.01.20</u> .20.20.20.20.20.20.20.20.20.20.20.20.20.	
Test spaaificetion:	Nahrungsmittelmaschinen – Hygisnoanforderungen vom QAA-SL-N-6308 - Mikrobiolo	Allgemeine Gestaltu Juli 2009 (in Anlehnu gische Pröfung der F	ngsgrundsätzei - ing) Reinigbarkoit vor	- Teil 2: n Oberflächen
Vareneingangedatum: Date of receipt:	21.07.2018			the set
Prüfmuster-Nr.: Tost sample No.:	A000134252			
rüfzeitraum: Testing period:	03.08.2016 - 12.08.2016			
Ni der Prüfung: Nace of testing:	mikrobiologisches Labor Nürnberg		Station.	
rüfleboratorium: osting leboratory:	TÜV Rheinland LCA Product GerbH	5		2
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ste Namo / Posițio	97 Signature	Dala Nome	(Pasiāoa	Signalura
onstiges / Other: Illage sind die Urinale In	Die Ergebnisse sind auf den fi der Enlociokumentation darge	olgenden Seiten dies stellt	es Prüfberichter	s dargesteilt. In de
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+ construction permit

### **Role of Plumber**

Plumber works with company, if somthing goes wrong company is responsible for any damange. For the construction of new building and aprartments, watersupply and drainage drawings need to be submitted to district water supply office.

Building inspector visit the site and check the installations. The number of water supply connections are checked. He also chek the installaions as per the drawings or not , and certify it.

The pressure test were carriedout for water supply and for the draiange smoke test is performed. The gas installations are aslo cheked.

Salary for the plumber is 4100 CHF and for Master Plumber it is 8000 CHF

# Site Visit

Site visit, Sissach, Switzerland.

The installation of pex pipes for water supply, in apartment building.









Safety precautions during laying the drainage line











#### **Toilet for Disabled Persons**



**Plublic toilet** 



Moveable toilets



Moveable urinals

