

## **PROPOSAL TRAINING LIFE CYCLE COSTING AND DESIGN FOR WATER SYSTEMS**

Location: The Netherlands

Duration: 10 days of training

Date: 18- 31 May 2016

Organiser : Dutch Water Authorities

Didactical approach: learning by doing, sharing, discussing, listening, seeing and practicing.

### **Description**

The area of focus is Life Cycle Costing and Design for water systems including sluices, canals and embankments. The central question is: how to design, operate and maintain water system assets in such a way that an effective balance between performances (stakeholders requirements), risks and life cycle cost is obtained. The topic is approached from different angles: theory and practice on technical, managerial, institutional and financial aspects and stakeholder interests.

The learning targets of the training are specified in a request formulated by the Blue Gold project team. In the day-to-day training schedule the learning targets are linked to the presentations and field trips. Further, the participants will be asked to prepare specific questions, problems they encounter in Bangladesh or other issues from their own experience they wish to discuss during the training. These issues will be discussed during the first day and will get special attention during all lectures and field trips.

The training is a mixture of a theoretical approach and common practices in the Netherlands. Participants will have plenty of possibilities to ask for clarification and experiences from trainers, field personnel and stakeholders. A lot of time (4 half days) is reserved for reflection and translation of new information to the participants' own work environment. Two workshops are designed to practice risk based maintenance strategies and long term asset management planning on a water system case study.

Technical aspects of water systems and assets like different life cycles of components, will be dealt with. Field visits are planned to an equipment manufacturer, a dredging project and a high water protection program. Attention is given to the use of tools like life cycle costing and software for data-analysis and water system modelling. During the training participants will work on their own group assignment. Based on their learning objectives they will gather information, analyse information and formulate their final results. These will be presented to a committee of experts who will provide immediate feedback. After the training the participants will have practical luggage and inspiration that will be of use in their regular work.

### **Lecturers**

The training is prepared by the Dutch Water Authorities (DWA), for whom operation and maintenance of water infrastructure is the core business. All lecturers are professionals in asset management and Life Cycle Costing, and all have experience in organising trainings, lectures and field trips. Part of the team of lecturers has international experience in Africa, South East Asia, Middle East. Henk Weijers and Michaël Bentvelsen have visited the Blue Gold project. The team of lecturers is supported by Martine van den Boomen, who has her own consultancy company in asset management and who has an outstanding track record in this topic. She is also guest lecturer at the TU Delft. Further, we collaborate with mr Asella Pathi-

nara from UNESCO-IHE, who has an excellent track record in international education and who is familiar We have invited MottMcDonald /Euroconsult to participate in the training, focussing at the role of a consultant and engineering company in the Life Cycle of water Infrastructure. with South Asia, including Bangladesh.

Optional: As an option we propose that we provide an “assistant course manager”, a junior water management expert to accompany the participants during the whole training. The experts will have the following tasks: support the participants with the assignments, clarify issues, evaluate the program, and general troubleshooting, also regarding logistics. This expert could be Ruud Leibbrand from the Blue Gold program, or a trainee in the Netherlands. The advantage of selecting Ruud Leibbrand for this task is that he is well introduced in the Bangladesh situation.

## **Logistics**

DWA will organise the lectures field trips and work sessions. During some of the days we will be able to provide a lunch (halal) .

We expect that Euroconsult/MottMacDonald will organise transport, hotel accommodation, lunches during some of the days, and, if applicable, DSA's. The first 3 days the training will take place at the UNESCO-IHE buildings in Delft. On 23 and 24 may participants will stay in a hotel in Almelo. The last part of the training we will be back in Delft, again at the UNESCO-IHE. UNESCO-IHE offers class rooms, halal food during lunch and has a prayer room.

## **Costs**

We can offer the training, (logistic not included as stated above) for the following costs:

Colibri advies: organisation and coaching of the lecturers, coordination of the content, preparation of syllabus; lecture on theory of LCC, contribution to exercises: maximum of € 10.000 + VAT. Colibri will be paid based on spent hours and costs.

UNESCO-IHE: contribution of mr. Pathinara & 5 days class rooms & lunches : in total €6.000 +VAT

Dutch Water Authorities : 11 half days @ €600 /half day : € 6.600 +VAT

This tariff includes all spent hours for preparation & organisation and is approximately 50 % of the real costs. The involvement of Michaël Bentvelsen is not invoiced, his hours are covered by Dutch Water Authorities.

Optional assistant course manager : € 5000 +VAT

Unexpected costs we might have to make regarding reproduction, logistics , extra support for the lecturers or field trips : max € 3.000 +VAT We will only invoice costs based on spent hours or out-of-pocket costs based on invoices by third parties.

Total costs: € 25.600 +VAT

Total costs including an optional assistant project manager: €30.600 +VAT

## PROGRAM

We have drafted the following program (see schedule). All items are confirmed except the contribution of Euroconsult and the item on the use of software. For the latter we are confident we will get confirmation soon. All lecturers has committed themselves to the topic, place and date of their contribution. However due to unforeseen events there might be changes in the program.

day nr	topic	content	lecturer	location	hotel	learning targets
18 may	introduction	overview of the training, expectations, learning objectives, explanation of the assignment	Michael, Assela ( <i>confirmed</i> )	Delft	Delft region	
18 may	design of installations	field trip KWT, manufacturer of valves, gates, etc	Wim Vis ( <i>confirmed</i> )	Biddinghuizen	Delft region	ii, iii, iv: identification of infrastructure components having different life cycles; O &M of different components and expected freedom /lifetime of individual components; design principles
19 may	theory of LCC	Life cycle costing for engineers, making LCC decisions, Net present value, equivalent annual costs, etc	Martine ( <i>confirmed</i> )	Delft	Delft region	i,ii: application of LCC to water management infrastructures, identification of different infrastructure components having different life cycles
19 may	design process	role of engineering company, asset management incorporated in the design process,	<i>Euroconsult (to be confirmed)</i>	Delft	Delft region	ii, iii, iv: identification of infrastructure components having different life cycles; O &M of different components and expected freedom /lifetime of individual components; design principles
20 may	maintenance planning exercise	theory of LCC, design exercise	UNESCO-IHE, Assela Pathirana	Delft	Delft region	vi: hands on exercise of the LCD and related software

			<i>(confirmed)</i>			
23 may	instruments for asset management	legal instruments for maintenance (keur, Legger), different type of tendering proce- dures	Henne, Wim <i>(confirmed)</i>	Lelystad		v: responsibility, ownership institu- tional legal tech- nical and financial aspects
23 may		field trip dred- ging company	Wim Vis <i>(con- firmed)</i>	to be decided	transfer to Al- melo	viii: LCC &D in prac- tice
24 may	maintenance	risk based maintenance, long term asset management planning, devel- opment of a risk matrix, physical and functional decomposition of the water sys- tem,	Marcel <i>(con- firmed)</i>	Almelo	Almelo region	iii,iv,: O &M of dif- ferent components and expected free- dom/lifetime of in- dividual compo- nents; design prin- ciples and method- ology
24 may	maintenance	risk assesment using Failure Mode Effect and Criticality Analy- sis, making an LTAP	Marcel <i>(con- firmed)</i>	Almelo	Almelo region	iii,iv,: O &M of dif- ferent components and expected free- dom/lifetime of in- dividual compo- nents; design prin- ciples and method- ology
25 may	organisation & roles	Dutch Flood De- fence program: stakeholder management, innovations, mul- tilevel safety	Myra Cremer <i>(confirmed)</i>	Tiel		v: responsibility, ownership institu- tional legal tech- nical and financial aspects
25 may		field visit O & M practice	WSRL or Vechtstromen <i>(confirmed)</i>	Tiel	Delft region	
26 may		prioritising of investments,	Roland Boer <i>(confirmed)</i>	Delft		iv ,,: design princi- ples and methodol- ogy
26 may		working on as- signment	Michael , As- sela <i>(confir- med)</i>	Delft		x, xi

27 may	design and maintenance	Dutch Flood Pro- tection Program: complex pro- jects, inspec- tions, major overhauls, maintenance	Henk ( <i>con- firmed</i> )	Leiden		iii: O & M of differ- ent components and expected free- dom of individual components
27 may		field trip	Henk ( <i>con- firmed</i> )	Leiden		iii: O & M of differ- ent components and expected free- dom of individual components
30 may	instruments	use of software like GIS, SOBEK	?	Delft		viii practical demon- stration of how LCC& D are prac- ticed with emphasis on use of software
30 may	assignment					
31 may	assignment	working on as- signment	Michael, As- sela ( <i>confir- med</i> )	Delft		x, xi
31 may	conclusions	presentations, conclusions, re- port, reflection, feed back and discussion of "lessons learned" translation to Bangladesh sit- uation.	Michael ,Martine, As- sela,, & lec- turers ( <i>con- firmed</i> )	Delft		x, xi

CV,s of the involved lecturers in the LCC training for the Blue Gold program 18 -31 may 2016

**Martine van de Boomen** : see attachment 1 and check [www.colibri-advies.nl](http://www.colibri-advies.nl) Martine (MSc Delft University) is a professional in asset management. She is guest lecturer at the TU Delft. She has lived in Yemen.

**Marcel van Zutphen** : see attachment 2 : He is working as asset manager for the Vechtstromen Water Authority. He has an MSc at the TU Enschede. He is also guest lecturer at Wateropleidingen.

**Henne Ticheler** (MSc Wageningen University) is professional in asset management with the Zuiderzeeland Water Authority. His expertise He has lived for a number of years in Africa and is currently involved in an international cooperation project with Ethiopia.

**Henk Weijers** is asset manager/ project leader with Rijnland Water Authority. He has lived in Thailand and has visited Bangladesh (Blue Gold project) in January 2015.

**Wim Vis** (BSc in civil engineering) is a project leader for Zuiderzeeland Water Authority.

**Asella Pradithara** : see : <https://www.unesco-ihe.org/assela-pathirana> He has a PhD from Tokyo University and is associate professor at UNESCO-IHE.

**Roland Boer** is professional Asset manager at Brabantse Delta Water Authority. He has a BSc form the Rotterdam School of economics and followed a postacademic training asset management at the TU Delft.

**Myra Kremer** has a MSc from the Southbank University (London, UK) in Civil engineering . She is sr. policy advisor at Rivierenland Water Authority.

**Michaël Bentvelsen** works as policy officer international projects for the Dutch Water Authorities. He has an MSc environmental Engineering (Water quality) at the Wageningen University.