
Logical – Mikhail Shilin


Fragile eco-system – Alex Alkhimenko


New solutions – Dmitriy Golubev


Outdated rules – Alex Obukhovsky


Proper control – Darija Ryabchuk


Satellite scanning – Vitaliy Sychev

Nasdrovia!

It might have been snowing when I arrived, writes Tony Slinn, but the warmth of the welcome from our Russian hosts, along with their wonderful hospitality, ensured a conference to remember in a magical city


Port development – Nina Blaznova


Nobody cared – Leontina Leonidovna


Solution for Sochi – Buu-Long Nguyen


BATNEEC – Siegfried D'haene


Measured effect – Olga Kijko


Concentrations – Alexander Rybalko

Entitled *Eco-Friendly Dredging in the Modern World* and hosted by the **Russian State Hydrometeorological University** (RSHU), the conference was the first **Central Dredging Association** (CEDA) venture in Russia – but almost certainly not the last.

Staged at the imposing Hotel Moscow on 13–14 October and including a technical visit to St Petersburg's 25km storm surge flood barrier (see *DPC* Nov 2009), the conference was organised by CEDA and RSHU along with **St Petersburg State Polytechnical University** (SPbSPU) and attracted about 100 delegates, including more than 30 from outside Russia.

RSHU's invitation followed last year's extremely successful seminar in Tallinn, Estonia, where **Prof Mikhail Shilin** pointed out there were many unresolved issues relating to both the assessment and monitoring of environmental impacts from dredging in the Gulf of Finland and especially Neva Bay.

In promoting what turned out to be an extremely frank exchange of views in St Petersburg, Professor Shilin – who co-chaired this year's event with the chairman of CEDA's *Environment Commission*, **Polite Laboyrie** – said at the time: "It was only natural and logical that in searching for qualified and experienced answers, the Russian specialists who carry out environmental impact assessments [EIAs] in the Gulf of Finland are looking forward to an exchange with their colleagues from CEDA."

Welcome To Russia!

SPbSPU rector **Prof Lev Karlin** set the tone, stating that "the gigantic projects going on in the Gulf of Finland and their ecological impacts are of huge concern to the citizens of St Petersburg."

His university, part of a European network studying coastal areas, celebrates its 80th anniversary in 2010 and will also be staging the UNESCO Oceanographic 50th anniversary congress in April – "I have the privilege of inviting you to attend," he concluded.

Polite Laboyrie emphasised CEDA's commitment to 'building with nature' and thanked the Russian authorities that had enabled "this unique seminar to take place. What CEDA wants is that dredging decisions are made from the point of view of best practice and knowledge," he stated.

That was a theme echoed by SPbSPU's civil engineering dean, **Professor Alexander Alkhimenko**: "The Gulf of Finland has a very fragile eco-system and I believe one of the most important issues for this conference is a future solution for sustainability."

Concluding the welcomes, the consuls general of Belgium and the Netherlands, **Marie-Jehanne Roccas** and **Anthony van der Togt** respectively, expressed delight that Belgian and Dutch contractors (and event sponsors) Boskalis, Damen Dredging Equipment, Dredging International, Jan De Nul and IHC Merwede were working alongside Russian agencies and companies, such as sponsors Eco-Express Service, both within St Petersburg and beyond. "It's important to study the ecology," said Van der Togt, "and I've been impressed by how the environmental aspect has been tackled. This conference marks a very important collaboration and I'm sure it will be successful."

Keynotes

St Petersburg's environmental protection and ecological safety committee chairman **Dr Dmitriy Golubev** reminded delegates in his keynote speech, entitled *Experience of Technical Projects*, that dredging in St Petersburg included the city centre canals and channels that help prevent flooding. As he spoke, small dredgers were at work in the Griboedov Channel – "During 2009, we plan to finish remedial dredging in the channel as well as in the estuarial part of the River Fontanka," revealed Golubev.

Describing the safeguards and techniques involved, he invited contributions from CEDA: "The efficiency and productivity of carrying out the wide spectrum of works connected with cleaning the city's many water areas is determined by the equipment available. And we are actively looking for new solutions and technologies in dredging."

Former Russian Navy captain **Valery Zaytsev**, now with the Russian Federation's Baltic Directorate on Technical Provision of Sea Supervision (BDTPSS), took a broader view. In particular, he described the problems created by pollution in both the Gulf of Finland and the southern part of the Baltic as a result of open sea disposal of dredged material.

"We have seven disposal sites in the Russian part of the Baltic Sea, all designed for special purposes, mainly port construction," he stated. "The problem today is over-filling of those sites and the impact on fish life and the coast." Using satellite photos to illustrate his point, Zaytsev said that research by the RSHU and other universities had shown "hydrocarbon limits exceeded by three or four times with heavy metal limits exceeded three to five times. And turbidity leads to secondary pollution."

Action is being taken, he said, outlining the *HELCOM* and other major programmes that aim to support the development of measures to deal with hazardous waste. Above all, he called for improvements in Russian legislation to bring it into line with international standards.

First Session

Eco-Express Services' **Dr Vladimir Zhigulsky** took the chair and his colleague **Alexander Obukhovsky** took the floor to tackle the theme *What Connects Dredging with the Environment*? And the environmental aspects of dredging the Russian sector of the Baltic Sea remained prominent on the agenda.

"Port development projects are growing exponentially," Obukhovsky commented, "making it vital to protect both the sea and ecological systems. But the key problem is that standards and regulations were drawn up in the 20th century and are outdated. They don't take into account the multiple factors resulting from industrial measures – with the result that:

- "There's inadequate assessment of the damage caused
- "There are differing environmental monitoring standards, mostly inadequate
- "We don't have enough data to properly measure the impacts, especially on fish reserves, and
- "Funds are spent without focus on the true problems."

For the future, Obukhovsky called for harmonisation of Russian and international regulations, new legislation and a focus on environmental sustainability.


Sensitivity – Vladimir Pogrebov


Relatively dynamic – Tatyana Eremina


Seeking synergy – Paul Vercruijsse


Overflowing – Marcel Van Parys


Not simple – Nick Bray


Foreign relations – Anatoly Bogush

Boskalis senior engineer **Stefan Aarninkhof** built on the latter theme with his take on 'building with nature' research and its potential impact on the Baltic. Looking at recent projects in Europe and the Middle East, he pointed out that the trend was towards more environmental monitoring. "We need to build with nature," he said, "and 'eco-dynamic design' are the new keywords."

He explained how that translated into Europe's *EcoShape* initiative – instigated by Boskalis and Van Oord and backed by ports, industry, consultants, universities and government agencies with a €29M budget – and detailed the objectives, including understanding the dynamics of natural systems, optimising environmental and economic development and the integration of disciplines. Embedded within this is the ongoing turbidity assessment software (TASS) project that aims to predict turbidity around dredgers.

Pilot projects along the Dutch coast, and especially in sand mining pits, would help inform Baltic practice he said, explaining how TASS could achieve it: "Rather than leaving a flat, ecologically poor seabed in the mining pit, ecologists have suggested the realisation of bed-level gradients and morphological features promoting species richness and diversity."

The RSHU's **Dr Sergey Lukyanov** and **Darija Ryabchuk** took up the baton, reviewing the disposal site research that had backed Valery Zaytsev's keynote. With the Baltic's contaminant levels so high that the *World Health Organization* advises against eating large fish caught in the sea, both speakers called for more monitoring, more research and greater harmonisation of regulations.

"We found that dump sites were chosen at random with no thought of what would happen in a flood. And we still have don't have enough information on their long-term effects or recovery times," Lukyanov stated.

"Proper control and monitoring should be in place for any future project," Ryabchuk concluded.

Which left RSHU's UNESCO chair **Prof Vitaliy Sychev** to wrap up the session with a review of what's being done to monitor construction and dredging projects in the area – especially via high-resolution satellite scanning – and how students are now being involved in the studies: "Water quality, turbidity and the impacts of such projects as the storm surge barrier are all part of the work," he stated.

Session Two

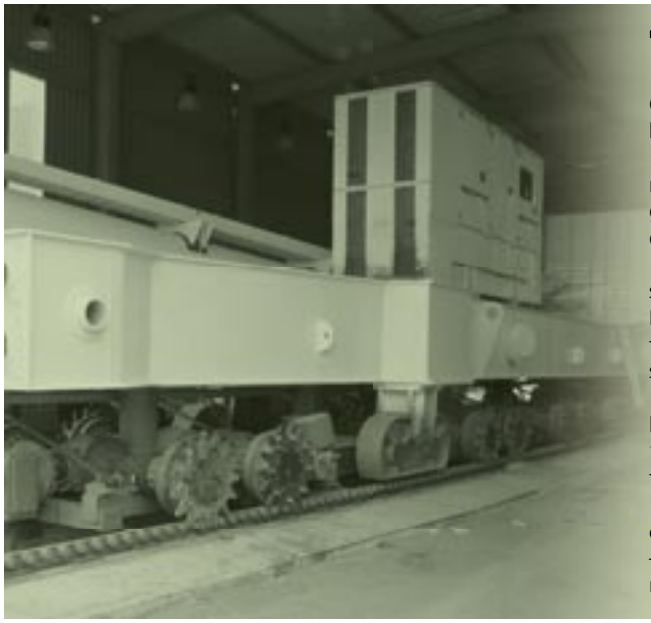
Following lunch that included a vodka tasting, Dredging International's resident manager in Russia, **Nina Blaznova**, took the chair and the floor to explain DI's role under the theme *Dredging for Port and Infrastructure Development*.

"We've been active in Russia for 10 years," she said, outlining projects that include work on the flood barrier as well as the Port of Ust-Luga where such TSHDs as *Brabo*, *Lange Wapper* and *Reynaert* have dredged the access channel and the port's southern area. She emphasised that DI's environmental approach was to the best international standards and pointed out that some 50% of current DI projects involved port development.

A programme change saw **Dr Sukhacheva Leontina Leonidovna** from the Russian Institute of Remote Sensing Methods for Geology using satellite scans to explain the impact of port development projects on Neva Bay and Gulf of Finland pollution levels.

"Yes, there were bans on dumping material, but nobody cared," she said. "According to our observations, over 20M m^3 was dumped over three years – and if nothing changes there'll be more damage. As for rehabilitation, that's in the remote future only."

It was down to Boskalis's **Dr Buu-Long Nguyen** to change the tone with a look at beneficial reuse of dredged material pumped over long distances to avoid snarling local roads with trucks and thus overcoming logistical and



Technical Visit

Conference delegates were among the first to traverse *under* the Port of St Petersburg's main Kronshtadt Shipping Channel!

As noted earlier, the previous issue of *DPC* has a full report on dredging the new access channel and building the anti-flood storm surge barrier, but it was great to meet Boskalis' project manager **Pieter van Vuuren** in person – and, despite the freezing conditions, to visit the immense, 25km-long site.

We went under the access channel via a tunnel that will eventually link both sides of Neva Bay and form part of the city's ring motorway, as Pieter's deputy, **Eduard Silantiev**, explained in the pre-site briefing. And I'm here to tell you that it's quite weird arriving on the other side in an excavation pit and seeing a ship some 25m above your head!

There're two main surge barriers of which the biggest pair look like ships' hulls and are 'floated' into position, driven by enormous rods attached to 'trains' that have been modelled on the carriage (*see photo left*) used to transport Russian spacecraft to their launch pad, I was told.

The delegates were long on admiration and short on time and it was back on the bus sooner than we'd all have liked. Still, there was a consolation – delicious meat-filled Russian pastries and, of course, more warming vodka all round. How better to conclude a perfect day?

Questions & Answers

Q – Who pays for pollution in Russia?
A – "No-one. With silt curtains at $150 a metre and no legislation, who suffers? Only the ecosystem!" – **Sergey Lukyanov**

Q – Is any legislation planned to deal with dredged material?
A – "Licences are issued for sand and gravel extraction and there are a number of laws" **– Andrey Issayet**

Q – Disposal sites don't appear to be controlled – why?
A – "There are only very timid steps towards unification of rules and regulations" – **Valery Zaytsev**

Q – How can we [RSHU and CEDA] help each other?
A – "There's experience in Holland and Belgium so you don't have to reinvent the wheel" **– Daan Rijks**

Q – How can we protect the environment?
A – "Don't set a blanket discharge level for dredging projects, it's not the answer" – **Lindsay Murray**

Q – How can we learn from other projects?
A – "Don't copy, every situation is different" – delegate **Gerard van Raalte**

Q – What are the areas for collaboration?
A – "Turbidity and policy development. This will give a more positive outcome than exchange of knowledge" – **Stefan Aarninkhof**

environmental concerns when building highways. His case study on the Utrecht to Amsterdam motorway, which involved the pumping of 2.5M m^3 of sand over 12km, "could be a solution for the Sochi Olympic Park", he said, concluding the session.

Session Three

Themed *Dredged Material Management* and with the EcoProject Environmental Agency's **Dr Olga Kiyko** in the chair, DEME Environmental Contractors business development executive **Siegfried D'haene** kicked off the third session with a study of sediment management in port areas that ranged from techniques in the Middle Ages to today's BATNEEC philosophy – 'best available technology not entailing excessive costs'.

Looking at beneficial use, especially initiatives in Flanders, he described the huge, under-construction AMORAS plant in the Port of Antwerp, which will deal with 600,000 tonnes of dredged material annually. "We've proved that in Belgium even huge quantities of dredged material can be treated and reused," he stated.

DHV's **Daan Rijks** brought us up to date with measures to prevent flooding in Jakarta (see *DPC* March 2009) using small dredgers and techniques developed in Holland.

"Start dredging, but expect the unexpected!" was his watchword for the project, which not only deepened the myriad canals, but cleaned them up too. "We boosted dredging's public image in the process," he said. "People are no longer throwing waste into the water."

From chair to floor, Olga Kiyko also reprised coastal ecosystem monitoring of dredging and disposal sites in the Gulf of Finland, especially Luga Bay and including monitoring during material placement.

"The measured effect included metals in suspension due to dredging stirring up the bottom and we're now monitoring areas of Luga Bay where dredging has increased the depth," Kiyko concluded, bringing the session to a close.

Evening Treat

A question and answer session ranging across the day's presentations (*see panel left*) followed – as it would after day two – that not only answered intriguing questions, but captured the spirit of frankness and open exchange that typified the conference.

And then it was off to possibly the most lavish reception I've enjoyed at a CEDA conference: everything you've heard about Russians and vodka would appear to be true!

It was also notable for short speeches from the organisers. The speakers included RSHU vice-rector for international relations **Dr Anatoly Bogush** – who is also a Fellow of the UK's Royal Meteorological Society – along with Anthony van der Togt and **Andrey Issayet**, who came all the way from Moscow's Federal Department of Marine Control.

They were, of course, accompanied by plentiful toasts...

Day Two

Astonishingly, almost everybody made it for the 8.30am start of session four, themed *Sand and Gravel Mining*. And with **Dr Vladimir Pogrebov** in the chair, first speaker **Prof Alexander Rybalko** swept away the cobwebs with a blunt assessment of the Gulf of Finland's geo-ecological situation.

Outlining the range of major projects in Neva Bay from 2007, he pointed out that "turbidity during that time increased by a magnitude of two orders with the major concern being secondary pollution because of heavy industrial construction. When we measured throughout the water column, we found only 2% was organic material. The result has been a large accumulation of silt on the seabed."

Detailing the range of pollutants, he stated: "By 2008, we were seeing degradation of the seabed's ecological situation – pretty much predictable as about 50% of the sediment was clean fines which started to absorb the pollutants." His concern was that despite measures to reduce pollutants, Neva Bay concentrations are continuing to climb...

Vladimir Pogrebov – the EcoProject Environmental Agency's principal specialist – came to the floor to examine the environmental impact of Petrotrans' extraction of iron-manganese nodules from the Gulf of Finland's seabed.

"We used an environmental sensitivity study as a base to construct seasonal maps showing the impact of pollutants," he told delegates, "which we found highest in summer, lowest in winter."

The study covered "about 125 species of birds and ducks, plus the ringed and grey seals, of which we have only about 300 individuals." Concluding, Pogrebov said the main negative impact was on seabed invertebrates.

Dr Lindsay Murray of Cefas UK outlined the impacts and mitigation of marine sand and gravel dredging in Britain – contributing about 20% of the aggregates used in construction.

"Essentially, the further out and deeper the sand mining pits, the less the impact," she said in a presentation that covered marine benthos impacts, sediment plumes and cumulative effects. "The EU is now suggesting a planned approach [to the latter], based on cumulative impacts that include wind farms and fishing."

Experimental restoration of the seabed proved "successful – gravel seeding could be a useful mechanism for restoring the seabed in some areas," she commented, turning to mitigation projects. And, in summary: "There have been significant advances in the last few years, many of the measures coming from the dredging industry itself in order to minimise impacts," said Lindsay, wrapping up the session.

Final Session

With a break-time hair of the dog for those still recovering from the reception toasts, there was no excuse for not tuning into chair and first speaker, **Professor Tatyana Eremina** from the RSHU, with the theme *Dredging Equipment and Possible Effects*.

Explaining how parameters for her study on suspended material's impact on the eastern Gulf of Finland's ecosystem were developed by both Russian and Finnish universities and research agencies, Eremina "tried to assess the impact of dredging based on monitoring, but it became clear we needed mathematical modelling."

Using baseline hydrographic maps from the 1920s, Professor Eremina detailed how human activities had affected Neva Bay. "It's relatively dynamic and while we need port infrastructure, we should find a way to minimise environmental impacts."

MTI Holland's **Paul Vercruijsse** took up the challenge by relating how sustainable dredging equipment was playing its part.

"We look for PPP – people, planet, profit – in our approach and we're always looking for synergy," he stated, running through recent IHC Merwede dredger innovations, from hull optimisation through pump design and electronic control systems such as the one-man-operated bridge.

"Today's ongoing focus is equipment that eliminates possible pollutants," he added, "as well as reducing turbidity, energy demands and emissions."

And tomorrow? "Underwater noise is a new thing and we don't know where the research is going, but we're taking a proactive approach."

Jan De Nul's **Marcel Van Parys** complemented that presentation with his view of monitoring, modelling, prediction, and control of dredging – concentrating on dredger overflow systems and complete with a film showing overflowing during dredging. "Once a plume comes into contact with propellers, it's spread over a large area before settling. Can we improve this? Yes, we can build an overflow to choke it."

He went on to detail how such an overflow, with no air bubbles allowed in the underwater plume, could drastically reduce sediment settling times as well as cut the plume by as much as 60%.

And the future? "We need an automatic system to enable both a choked overflow and maximum production," maintained Van Parys.

It was **Nick Bray**'s job to conclude the conference. A *DPC* editorial board member, founder of Dredging Research, editor and co-author of the CEDA/IADC book *The Environmental Aspects of Dredging* and with a career spanning over 40 years, he was the right man for the job.

"I have a simple statement: my presentation is about the environment and for me, the environment is everything," he opened. And he went on to show just how difficult it is to build with nature, to monitor currents, waves, swell, suspended sediment and sensitive fauna and flora. "We have to identify an optimum type of dredging operation," he continued, "and model the project: that's not simple."

His slides showed exactly why it's not simple, by contrasting TSHD and CSD suction and pumping processes and especially plumes and suspended sediment predictions – "how it's discharged into the environment and what effect it has".

Using recent dredging of the Princes Channel in the Thames Estuary as an example of how to calculate plume distribution – "there are shellfish beds nearby and they don't like sediment being placed on top of them" – he looked at both passive and dynamic plume formation and the effects.

"Do we set a level of suspended sediment? Or predict levels and then make sure they're not exceeded?" he asked. "But how to monitor? At all points around the dredging operation? Or is it better to model and predict and then take spot measurements?"

Those conundrums left the delegates thoroughly intrigued – and perhaps opened the door to the next CEDA-RSHU conference.

Finally...

And then we trooped off for lunch – with a warming glass of vodka to help face the biting winds that were waiting for us during the technical visit to the new barrier. But not before CEDA general manager **Dr Anna Csiti** and Professor Shilin wrapped up the conference with thanks and presentations to all who had made it happen, not least the professor's right-hand lady throughout, RSHU international relations chief **Dr Maria Mamaeva** whose efforts had smoothed the visa path for foreign delegates.

"This has not only been a memorable, but a unique event," Prof Shilin concluded. "And I am sure the spirit of co-operation shown here will continue in the future."

More info at www.dredging.org

Quotes

- "CEDA is second-best to Twitter!" – **Polite Laboyrie** describing what CEDA does and who's in it
- "It's quite deplorable that we have a lack of necessary regulations in Russia" – **Valery Zaytsev** on contaminated dredged material in the Baltic
- "Old regulations simply don't match today's reality" – **Alexander Obukhovsky** on combating Baltic Sea pollution
- "Perfect pronouncement of my name for once, but then it does sound a bit Russian!" – **Stefan Aarninkhof** thanking chairman Vladimir Zhigulsky
- "We are Russians in Russia!" – **Nina Blaznova** on the staffing policy at Dredging International
- "If the owners had demanded compensation, the sums could have been quite significant" – **Leontina Leonidovna** describing pollution near St Petersburg spas
- "My presentation doesn't really fit in with the other papers..." – **Buu-Long Nguyen**, who was being modest
- "Sediment management is a reality in Belgian ports, so I can end my presentation now!" – **Siegfried D'haene's** opening gambit, but he had more to say...
- "You can't just dredge over them, it's not good for the project's public image" – **Daan Rijks** on coping with duck families and other obstacles in Jakarta
- "In Russia, we start thinking about the consequences after we've carried out the works" – **Alexander Rybalko**'s blunt assessment of some current projects
- "They are loved by decision-makers because they have very few colours and are easy to understand" – **Vladimir Pogrebov** showing comparative maps of seasonal Baltic Sea impacts
- "What are you trying to achieve?" – **Lindsay Murray** answering a very general question on how to protect the environment
- "Most of the construction is over, now we have to look at the clean-up" – **Tatyana Eremina** on dredging in Neva Bay
- "Peter the Great might have visited IHC's yards; I'm not sure, but it's possible" **– Paul Vercruijsse** taking the conference's top tenuous award
- "I often compare a hopper dredger with a bath" – **Marcel Van Parys** describes how sucked-down air influences the final stages of hopper draining