In a special WODCON environmental session, eight people from different facets of the dredging industry gave their personal views on effective approaches to environmental issues associated with planning and conducting successful dredging projects.

Dubbed the Eight Rules of the Road Panel, the session took place on Tuesday, May 29. The panel’s contents were not included in the official conference proceedings. This report is the official publication of the session, and is available in PDF form on request from IDR or from any of the panel members.

The discussion was meant to be somewhat provocative, and the statements are personal, not representing the views of the organizations or employers of the participants.

Rule 1: Regulations should be economically feasible and environmentally beneficial

By Neville Burt

The implication of Rule 1 is that sometimes the regulations are not economically feasible and not environmentally beneficial. How are they then motivated? Sometimes perhaps they are driven by a political ideology rather than being well grounded in scientific understanding. They can in some circumstances give the illusion of protecting the environment while increasing costs and actually resulting in harm to the environment through a lack of understanding of physical and ecological processes.

One example is the overzealous application of the environmental windows concept, designed to protect nature from disturbance by dredging during (perceived) critical seasons. This can so limit the period when dredging is permitted that the dredging has to be concentrated, using more dredging plant (resulting in increased costs) and causing a higher shock load to the natural system (with potential environmental damage). At the same time natural floods can produce suspended solids concentration much higher than are ever likely to be achieved by normal dredging and nature is well adapted to cope with it.

Another example is where regulations force the dredge to dispose of the sediment outside of the aquatic environment, a long way from where nature put it, and thus preventing it from ever reaching its natural destination. Preserving the continuum of sediment movement in the aquatic environment could and perhaps should, except in the case of contaminated sediment, be seen as the most sustainable solution to disposal. Trials in the UK have shown that colonization of muddy dredged material placed in intertidal area is rapid and increases bio-diversity. Also in the UK, monitoring of sea disposal sites has shown that there are not vast areas of devastation; in fact in many cases the disposal sites have been shown to be healthier than the reference sites.

One more example is the enforced use of silt screens around a working dredge. As well as the extra cost involved, these may concentrate the suspended sediment in the enclosed area and at the same time prevent the fish from escaping from it.

Perhaps, in forming regulations, the relevant authorities should consider the social, economic and environmental consequences of not dredging, such as increased flood risk due to silting up of channels. In many UK estuaries the ecology is adapted to 100 years of continuous dredging. To stop dredging would be a major environmental change with unknown consequences. Regulations should result in sensible decisions and not bring the legal framework of society into disrepute by forcing evidently unreasonable behavior.

Neville Burt is a Technical Director at HR Wallingford (the UK’s national hydraulics laboratory). He has worked there for the whole of his working life – almost 43 years. He is chairman of the Central Dredging Association’s Environment Committee and represents WODA at the London Convention.

Rule 2: Get all the facts before you start the dredging approval process.

By Dr. Robert Engler, PIANC

A proposed dredging project, either navigation, construction or environmental, can and is usually a very complex undertaking.

The complexity of the various components will include but are not limited to, engineering requirements, geomorphological impacts, contaminant issues, environmental habitat concerns, political interests, stakeholder involvement (supporters or opponents of the project), contaminants, contracting, beneficial uses, treatment, placement site availability and selection, sustainability, financing, regulatory constraints/requirements, and equipment availability.

More than a general knowledge of these and other drivers is mandatory to ensure project success. A project team is necessary, as it is rare that knowledge of all of the above attributes is found in a single person. Broad initial planning and stakeholder involvement is necessary at the beginning and should be routine over the entire process.

Facts regarding each step are a required driver as full documentation is mandatory. A summary of steps necessary for this factual documentation are listed below. The internet is a readily available source of factual documentation. There are listed below organizations that have authoritative Internet sites that may be useful in retrieving the needed information. Without knowledge and application of these facts, a project will falter, require more time and costs, and may simply be ruled unjustifiable.

Checklist for Rule Number 2:
2. Understand the dredging process: types of dredges: mechanical, hydraulic, special, others;
3. Know the regulations (national, regional, global);
4. Know the stakeholders (partners);
5. Understand sediment management;
6. Characterization of material is vital: physical, biological, chemical characteristics for dredging methods, use, placement or treatment options, impact assessment;
It is hoped that we will see increased training for those engaged in the dredging industry. The Regional Workshops run by IMO/UNEP in association with the London Convention being held in areas with attendance by representatives of developing countries is an excellent idea. Also the CEDA Environmental Training Packages and Texas A&M provide much needed training opportunities.

There is a need to develop a wider understanding of related environmental issues. Within most countries in the Eastern region an interest in the importance of environmental issues has developed, although, it appears that the importance given to any legislation varies from country to country, and environmental issues appear to be closely linked to social issues of the community. People are seeing a decline in the health of their waterways, lakes, rivers, fish stocks and estuarine areas. They are recognizing the need to achieve greater environmental protection while aiming for sustainable development. This recognition may however decline as people become more urbanized and no longer have an interest in irrigation, fishing and rural modes of water transport. The impacts of dredging on indigenous communities also have to be recognized, especially where activities such as fishing are required for survival.

The world is now at last recognizing the issues associated with climate change, which will increase the focus on activities perceived to be impacting on the environment. It is no good for dredging organizations to leave environmental matters to “specialists” like many people leave their tax returns to their accountants. Dredging people need to go into the community and attend meetings with consultants and clients with knowledge on how their dredging project will fit into the natural world to which we all belong and have a responsibility for.

John Dobson had a career as a professional civil engineer in Australia, predominantly on coastal and port structures, with a 20-year involvement with the management of dredging and reclamation activities. He was elected as the Secretary General of the Eastern Dredging Association (EADA) in 1989 and became the Chairman in 2001. He is particularly interested in the environmental effects of dredging and now assists a number of non-government conservation groups with coastal natural resource management, dredging and reclamation issues.

Rule 3: Use of appropriate technology is encouraged through promotion of information sharing and capacity building.

By John Dobson

We should all keep in mind that the World Dredging Association (WODA) is an “Organization dedicated to the exchange of knowledge and information”

Information sharing has become much easier in recent times with most communities now having access to the world wide web to source information. Web sites such as those of IADC, PIANC, WEDA and CEDA, with its Advancement Notes, provide a ready link to a lot of relevant information.

Despite the onslaught of electronic communications, journals and published papers continue to provide much useful information, but we must encourage the promotion of discussion about both the successes and difficulties in dealing with environmentally-related dredging problems. Technical papers from the eastern region of WODA now indicate that matters relating to the environment have become an important part of dredging research, projects and equipment.

Attending conferences and seminars is important. However, it is difficult for many to get to top class conferences and seminars such as this one (WODCON XVIII). Every effort must be made to encourage younger authors, and I congratulate the IADC and WEDA for their young author awards and more importantly applaud the organizations that have made it possible for younger people to attend. Recent seminars in India and China have given many in the Asian and Australasian region a better edge on how their dredging project will fit into the natural world to which we all belong and have a responsibility for.

Rule 4: Responsible contractors will respond to reasonable and responsible contract documents.

By Ancil Taylor, Bean Dredging LLC

Contract documents that have been prepared with realistic expectations, realistic performance measurements, and an in-depth understanding of the overall dredge process will yield a construction project that will meet the expectations of all parties.

As the industry in the United States in regard to dredging moves through a shifting client base, the USACE becomes a less significant player, and private industry becomes a larger consumer of dredging related services.

It is incumbent upon us to be sure our projects are developed and based upon sound engineering principles, and prepared in consideration of practical dredge dynamics. Our clients, both private and public, must have access to the experience and talent available through years of practical application of sound principles.

Ancil Taylor, vice president of the Bean Companies, has been involved in almost all aspects of the dredging industry for 30 years. His focus has been in the development of dredging science since the early 1980’s, and through his training with various organizations in the Netherlands has contributed to advancing the state of the art for dredging in the United States. Over the past 15 years he has been responsible for dredge operations of the Bean fleet of equipment as well as overall responsibility for the contracts under Bean Stuyvesant. He has served as president and chairman of the Board for the Western Dredging Association, and chairman of the Board for the World Dredging Association. He is Principal Consultant for Bean Consulting LLC.
Rule 5: Joint client / consultant / contractor input for optimized project output in all stages of a project.
By Gerard van Raalte

With the growing complexity of many projects, partly due to the increased number of environmental regulations and inherent intensified environmental control, it becomes highly unlikely that one of the key players in a project is capable of overseeing all aspects from the beginning till the end of a (port) project.

The main players can be defined as the ‘client’ or project owner, a ‘consultant’ often acting on behalf of the client, and the ‘contractor’.

The client is, or should be, fully aware of the local conditions, circumstances and requirements. How often does a port operator build a new port basin? Maybe once in 20 years? So it is not unlikely that he doesn’t know all aspects.

Therefore a consultant will often be engaged, charged with drafting project specifications. An experienced consultant will be able to provide knowledge on state-of-the-art technology and actual legislation. Consultants, however, are often less experienced in practical aspects of a project.

A contractor might run some 20 port projects in a year, so he knows the practicalities, but often lacks the local knowledge and must be informed about project conditions and requirements.

So it seems completely logical that these players join forces to obtain maximum project outcome. Such communication should start at the early stage of the project: when the concept is being drafted, reflecting the needs, the limitations and the possibilities. This is the opportunity for creating a win-win situation.

In several countries such pre-project client-consultant-contractor communication is prohibited under regulations of ‘competition’. Experiences in other countries have shown that open communication between parties on projects during preparation stage can lead to optimized project output without infringing on principles of fair competition.

This principle would in theory apply to all projects, but when environmental aspects are involved, usually expanding the number of stakeholders, it becomes even more important.

Gerard van Raalte is senior expert with Hydromantic, the in-house engineering company of dredging giant Royal Boskalis Westminster. As senior expert, one of his tasks is to bring together all players in a common understanding on the many international projects, where environmental challenges add to the complexity of the projects.

He is a member of the Central Dredging Association’s Environment Committee and of the Environmental Committee of the European Dredging Association. He frequently lectures on environmental aspects of dredging.

Rule 6: Sediments are more than dredged material – management schemes should be part of system-wide management.
By Axel Netzband

Totally undisturbed, natural waters do not need either dredging or sediment management. Dredging serves human needs. Nature needs protection; legitimate uses are necessary for human well-being. Integrated management schemes are meant to combine these needs.

Dredging is not a purpose of its own. Generally it should be as minimal as possible due to costs and environment. In order to achieve this, an approach is needed that considers the wider sediment transport processes, measures, and effects.

Dredging and disposal have effects on the environment. Partly, these effects are intended, partly they can be mitigated. Comparable effects occur naturally as well.

An integrated approach can bring natural effects and dredging effects in relation. Dredging may relocate contaminants, if there are any in the sediment. But nature may do the same. Dredging itself is neither a source nor a loss. An integrated approach can show where the real source is, and combine the needs of dredging with a real source control.

System wide management (sub) river basin) allows for shifting the scope. It allows going to the real sources of sediment and / or of sediment contamination.

Axel Netzband is project manager for sediment management in the Hamburg Port Authority. He is chairman of the European Sediment Network SedNet and of PIANC Environcom working group 13 “Dredging Management Practices for the Environment”.

Rule 7: Monitoring and control programs shall be ecologically motivated, economically reasonable, technical feasible.
By Anders Jensen

Dredging projects throughout the world are facing increasingly stricter environmental constraints and requirements from authorities, project owners and banks. The resulting monitoring and control programs are becoming increasingly complex and costly, but do they do any good?

It is not a simple task to design an environmental monitoring and control program for dredging projects which at the same time is ecologically motivated, technically feasible and economical reasonable. Too often dredging projects become subject to requirements which fulfill neither of these objectives and at best are a waste of resources and sometimes work contrary to protecting the environment.

Monitoring and control programs must be focused on variables which will be (or can be) directly affected by the dredging project. The parameters (parameter can be e.g. turbidity, seagrass coverage, mussel biomass and the like) chosen for monitoring must fulfill the following criteria:

- The parameter must be measurable at a reasonable cost;
- The results must be reliable;
- The results must be statistically significant;
- The results must be predictable (cause and effect must be established);
- The variable must have a short response time;
- The limits of impact must be reasonable and established for the benefit of the environment.

Fixed threshold values on monitoring variables are not necessarily for the benefit of the environment. For example laying down a fixed spill percentage or a fixed maximum level of turbidity is not necessarily beneficial for the environment because:

- It does not allow maximum activity during less sensitive seasons and conditions;
- The flux (dose to the environment) is not considered;
- Spatial distribution of spill across the work area is not considered;
- Relation between the limitation and the effect on the environmental response is only indirect.

Threshold values should be established based on proven and locally established relations between the dose and the effect on the environment.

Anders Jensen is chief engineer at DHI within the Danish department for coastal and estuarine dynamics. He is specialist in sediment transport and has expert knowledge of designing and planning monitoring programs for large marine construction projects. He has more than 20 years of professional experience in projects throughout the world.

Anders Jensen is member of the CEDA board of directors, and a member of the CEDA Environmental Steering Committee.

Rule 8: The public and environmental interest groups should be given the opportunity to be involved in the process early and often.
By Lindsay Cross

Example: Tampa Bay Dredged Hole Habitat Assessment Project

A two-year study of dredged holes in Tampa Bay, Florida organized by the Tampa Bay Estuary Program demonstrated the utility of public and environmental agency involvement. Numerous previously-dredged holes in the bay were being considered for use as dredged material dis-
posal sites to support U.S. Army Corps of Engineers maintenance dredging. However, anecdotal evidence suggested that many holes were used by fish and other organisms and were popular “fishing holes.”

Scientists sampled 11 holes for fish and benthic organisms, and performed water and sediment quality monitoring, while recreational anglers assisted with hook-and-line sampling.

The multi-agency assessment team ranked the holes based on their current habitat function, and developed appropriate management recommendations for each hole, including: do not fill hole, partially fill hole to stabilize shoreline, or fill hole to surrounding depth.

Several highly ranked holes were subsequently kept off the Corps’ list of disposal sites. Those holes providing poorer habitat value may be filled to aid in seagrass recovery or other habitat restoration initiatives. By involving the public and environmental interest groups in the decision-making process, dredging operations can provide a benefit, address specific community concerns, and foster a cooperative management of resources.

Lindsay Cross is the Environmental Associate at the Tampa Bay Estuary Program, one of 28 national estuary programs. She has a master’s degree in Environmental Science and Policy from the University of South Florida and has worked for the program for five years. She is involved with projects that address protection and restoration of Tampa Bay, such as finding beneficial uses for dredged material.

Panel Moderator
Craig Vogt, moderator and organizer of this panel, is chair of the WEDA Environmental Commission and a member of the WEDA Board of Directors. He is deputy director of the Oceans and Coastal Protection Division, U.S. EPA, in Washington, DC., co-chair of the National Dredging Team, and chair of the London Convention’s Scientific Group.