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**Als de duinen breken**

**Once the Dunes Breach**

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**Prof. dr. ir. M.J.F. Stive**

# Once the Dunes Breach





# Once the Dunes Breach

Valedictory address

Translation of the spoken address at the farewell of the post of  
Professor of Coastal Engineering at Delft University of Technology

On Wednesday May 10, 2017

By

**Prof. dr. ir. M.J.F. Stive**

Translation by MSc Mariette van Tilburg

*Rector Magnificus, members of the Board of Directors, Colleague Professors and other members of the academic community, highly esteemed audience, ladies and gentlemen:*

If the ominous title has somewhat alarmed you, then I say to you “that was my intention”. “Give us our daily bread and the occasional flood disaster “ is in our circles still a prayer deemed necessary. My dreamed successor has just showed you that if the dunes are to breach, the consequences will be fatal. More fatal than any other disaster. Cause to tremble ... but fear not!

I also have good news for you! Our coastal dunes are vulnerable but we are increasingly able to make our shores less fragile and more robust. And how have we come this far? This is the subject of my farewell speech.



*[slide 1: Sand Motor AKA Sand Engine]*

In general, my speech will tell the story of the fascinating development of coping with and thinking about the coastal system in general and the Dutch coastal system in particular, specifically the time after the completion of the Delta works in the Oosterscheldt. Multi-disciplinary research, such as Coastal Genesis, and innovative policy, such as the 1st Coastal Bill (Kustnota) of 1990, have led to a successful ‘soft’ strategy to safeguard the coast.

Around the turn of the century some serious reflection has taken place on the future of the Dutch water management. This has led to successful innovations in policy, research and interventions, such as the Delta program and the Sand Motor. The Netherlands are well prepared.

This farewell speech is my personal reflection on the just described development. The common thread in all of this are the many not-to-be-missed invitations that I have received over time. These 'sacrifices I could not refuse' are, in hindsight, a logical sequence of interconnected and mutually reinforcing activities.

### **The first steps (1977-1988)**

My first steps started in 1977. Despite the fact that one of my prominent predecessors, Professor of Coastal Engineering Eco Bijker, tossed three months of work on my graduation thesis into the garbage bin, he still recommended me at the hydraulic research laboratory, namely the 'De Voorst' branch in the 'Noordoostpolder'.

The vacancy into which I was accepted was mainly related to research on wave breaking in a task force on wave velocity led by Professor Battjes. As students we were already deeply in awe of Professor Battjes and, in my case, this only increased after my graduation. With the expertise and uncompromising precision that was typically his, he mentored me. How much have I learned from him.

At one point he suggested that I would use the research as the basis for my dissertation. And so it came to pass: on Tuesday 26 April 1988 I defended my dissertation "Cross-shore Flow in Waves Breaking on a Beach." Perhaps the most interesting work was the mapping of the internal velocity field, including turbulence in and under breaking waves. My dissertation does not mention the composition of the PhD Committee but I remember a lively and, at times, humorous discussion with some of my heroes: Kees Vreugdenhil, Herman Wind, Huib de Vriend and my promoter.

### **Coastal Genesis (1985-1987)**

In the mid-1970's a transition took place of the by 'Rijkswaterstaat,' (RWS - Department of Public Works and Water Management, Ministry of Infrastructure and the Environment) financed fundamental research (FOW) to more applied research (TOW). In the middle of the 80's, shortly before my PhD defense, it became clear that it would not be limited to this, but that a shift towards more



multi-and interdisciplinary research was imminent. A linking of disciplines, such as physical geography, historical geography, geology and engineering was widely encouraged by people from 'Rijkswaterstaat,' like Hans Wiersma, Job Dronkers and Luc Kohsiek, and by people from the Delft Hydraulics Laboratory, Herman Wind, Huib de Vriend, Pier Vellinga and with strong support of professors Joost Terwindt and Jurjen Battjes. At the time their vision, which I always greatly admired, was very progressive and resulted in the Coastal Genesis project (1985-1987).



*[Slide 2 Working Group 100 on site visit (source: Ad Stolk)]*

The new realization that coastal development started to happen on different scales, each with their intrinsic trends, was reflected in the establishment of three task groups: task groups 100, 1000 and 5000 with the numbers indicating time scales in years. The recognition of the importance of the longer time scale brought geology closer to our coastal research. This discipline sparked my budding interest in large-scale and, consequently, long-term coastal behaviour. Although my background did not formally give access to the 1000 and 5000 task groups, I was still given the opportunity to take part in these and to connect with “the grand dame of sea level rise” Saskia Jelgersma and my uncle and top-geologist Dirk Beets.

I was given another chance to learn so much. I started as the youngest assistant in Coastal Genesis amidst many eminent colleagues. To my surprise a unique opportunity was offered to me to direct the completion of the project. This meant, among other things, that I would write the final report.

But what was in fact the specific result of the Coastal Genesis project? I guess that the 1st Coastal Bill (1990), the Dutch Centre for Coastal Research (NCK), established in 1994, and the current coastal policy (1990-present) all are indebted to the Coastal Genesis project.

And content wise? There is probably too much to mention, but if I could choose, it was mostly the realization that the scale of sand-sharing of our coastal system is much larger than the scale we ever thought it had, based on the insights of the process at the time. Erosion of the Dutch coast does not mean that sand is “lost,” but that elsewhere in the sand-sharing system it is playing a role.

### **First Coastal Bill (1988-1990)**

The results of Coastal Genesis were an almost seamless, logical input to the rather remarkable 1st Coastal Bill. I was able to contribute my knowledge of the Coastal Genesis Project to substantiate the bill. In 1987 all Delta works in Zeeland were pretty much completed, and so there was time to reflect on the future; then minister Ms. Smit-Kroes choose to do just that. She decided that the time was ripe to introduce a structural policy on coastal erosion. The coastline of 1990 was chosen to be maintained as the benchmark coast line, acknowledging the dynamics, such as spray in the fore-dunes or tidal inlets. The type of interventions, intended to achieve this goal, were also innovative: especially ‘soft’ interventions as sand nourishments. From this time dates the famous saying: “soft where it can, hard where it must.” Our unique choice to maintain the coastline of 1990 is still reality: the coastline will never be located any farther back than the coastline of 1990!

### **ICCE 1990 in Delft**

These new insights in the coastal system behavior also stimulated our academic ambitions. Led by my illustrious predecessor Eco Bijker we have been able to expose our insights internationally at the bi-annual 22nd ICCE (International Conference on Coastal Engineering), held in this very same TU Delft auditorium in 1990. The weather was bad, the organization was sober, especially compared to the flamboyantly organized 21st ICCE in Malaga two years earlier, but the conference content was very successful. The official



welcome of Prince Claus von Amsberg, who was already interested in water issues, was unique. I hope that colleagues Reiniers, Roelvink and Aarninkhof will succeed to get ICCE to Delft in the near future.



*[slide 3 International Conference Coastal Engineering; Delft 1990]*

### **Innovation in sand nourishment (1991)**

What was started by the previous Minister of Transport was also embraced by her successor Minister May-Weggen. The Minister brought a, for me, memorable visit to the Delft Hydraulics (WL) in Delft, accompanied by the extremely amiable and expert 'Rijkswaterstaat' director ir. Gerrit Blom. The director of the WL at the time, Gaele Rodenhuis, challenged my colleague Rob Klomp and me: "I would like them to leave with a positive message." Because the department of public works was about to publish the 1st Coastal Bill, the coast seemed a suitable topic for an exchange of views with the Minister.

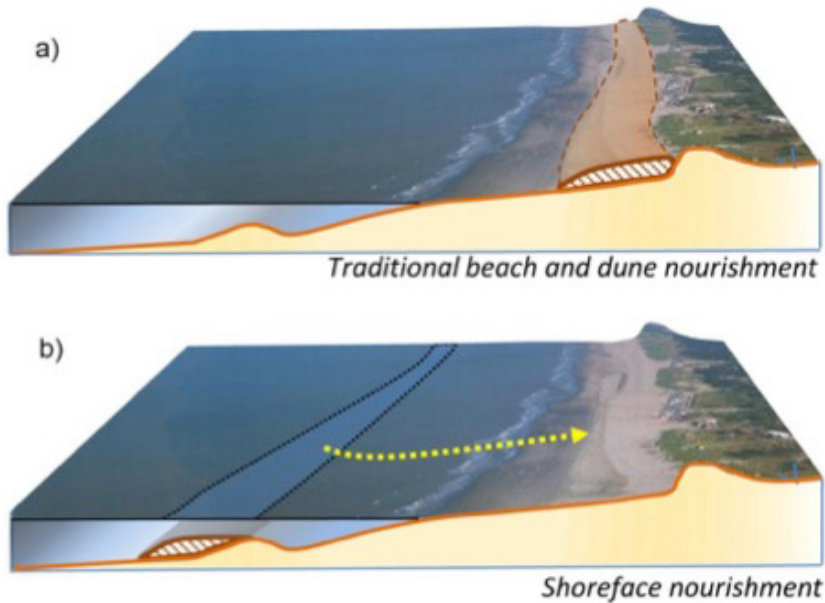


*[slide 4 Working visit May-Weggento Delft Hydraulics]*

In my inaugural address in 1995 I described it as follows: “In consultation with fellow researchers at ‘Rijkswaterstaat’, we considered this meeting an appropriate moment to recommend nourishment as a structural measure to the Minister. We also could provide the Minister with the perspective of cheaper nourishments. Our idea was that it ultimately does not so much matter where the sand in the coastal profile is supplemented as the fact that it is implemented anywhere. Moreover, if nourishment on the beach is rather costly and troublesome, then why not consider to do this just in front of the beach in the surf zone? “

After listening to my speech, Minister May-Weggen turned her head towards the Director General and whispered, yet audible to me: “This is a great idea, Gerrit [Blom]?” She left with my pamphlet “Coastal defense: soft but sure!”, and a short time later gave the green light for a pilot on the island of Terschelling.

In my inaugural address, I carefully wrote that it was too early to draw definitive conclusions for a policy on coastal maintenance, but in the meantime foreshore nourishments were performed in great numbers. After all, a successful innovation!



*[Image 5: Cartoon beach and shoreface nourishment]*

### Building with Nature (1991-present)

The “slow but sure” approach was from the 90’s on transformed into “Building with Nature.” When I say “Building with Nature” you will probably have various thoughts and images. One of my first associations of “Building with Nature” is the famous Ronald Waterman, who has been a very constant advocate in selling this concept. Delft Hydraulics (WL) also pulled Ronald Waterman in as advisor; one of the many affiliates on his unique business card of A4 format! This is how I got in contact with Ronald.

In his diverse provincial administrative roles, he has made a strong case for harmonious connections between environment and infrastructure. Harmony between environment and infrastructure goes back a long time; to the time that Ronald, as Deputy of the province of South Holland, had infrastructure and spatial planning in his portfolio. At the time, the first extension of the port of Rotterdam into the sea, known as Maasvlakte 1, took place. Together with colleagues Svasek and Agema he devised to execute the outer contour of Maasvlakte 1 as ‘soft’ as possible and to give natural values a clear place. Only recently these principles have once again been applied to the extension of Maasvlakte 2. Although the construction of Maasvlakte 1 already took place

at the end of the 1970s, the use of a 'soft' outer contour for a port of global scale is still seen as unique.

In later years I have had the honour to accompany Ronald on several of his trips abroad to advise on wet infrastructure with "Building with Nature" as a guiding principle.

### **Sabbatical at Universitat Politècnica de Catalunya (UPC), Barcelona (1992-1993)**

The beginning of the 1990s is marked by the personal and important decision to spend several years in Barcelona. If my time in Barcelona was seen as a sabbatical by Gaele Rodenhuis, I will never know; I have never asked him. In any case, he was the director who understood my "flight" from a prematurely accepted "promotion" to management. Pauline, my wife, noticed soon after my promotion how moody I was when I came home from my work every day. And then, just before Christmas 1990, another not-to-be-missed offer came along. This time by Professor Agustin Sanchez-Arcilla, asking me if I knew someone for a prestigious 'Researcher-of-Excellence' position at his Universitat Politècnica de Catalunya. During the Christmas holiday of 1990, we took the decision to present myself as a candidate and to go with the whole family to Barcelona. Agustin responded positively! Gaele Rodenhuis responded sportsmanlike as well. However, he did say: "If I still have a position for you when you come back, I do not know !" We just took that risk and left for Barcelona.

It was a fruitful time, scientifically, culturally and socially. We have made friends for life. I was also allowed to join and publish on field experiments as for example in the Ebro Delta, a very interesting delta, changing from river dominated to golf dominated delta.

In the summer of 1993 – everything was running smoothly, and I actually wanted 'to go' for a third year - I received an unexpected phone call from Gaele Rodenhuis: "would I please return as soon as possible to Netherlands." There was panic in Delft Hydraulics Laboratory. I will tell you why in a moment.

I did not want to just turn my back on Barcelona and agreed to round up the work. In that final and second half year of 1993 Agustin, Jose Jimenez and I came up with the idea that it was about time to develop a EU based initiative for a conference focused on coastal processes, which was also called for by the EU-funded programmes for coastal research. The existing alternatives were the highly respected ICCE and the more focused Coastal Sediments

(CS) conferences, both United States initiated. The creation of the Coastal Dynamics (CD) Conference, with the 1st 1994 edition in Barcelona, was very well attended and certainly fulfilled a need. The Coastal Dynamics series in turn inspired my dear colleagues Nick Kraus and Hans Hanson to bring regularity in Coastal Sediments conferences. As a result, a nice alternation arose between Coastal Sediments and Coastal Dynamics conferences, where we took turns to organize either conferences in the odd year that the ICCE is not taking place.

<b>Coastal Sediments</b>	<b>Coastal Dynamics</b>
1977 Charleston, SC, USA	1994 Barcelona, Spain
1987 New Orleans, LA, USA	1995 Gdansk, Poland
1991 Seattle, WA, USA	1997 Plymouth, UK
1999 Long Island, NY, USA	2001 Lund, Sweden
2003 Clearwater Beach, FL, USA	2005 Barcelona, Spain
2007 New Orleans, LA, USA	2009 Tokyo, Japan
2011 Miami, FL, USA	2013 Arcachon, France
2015 San Diego, CA, USA	2017 Helsingør, Denmark
2019 Tampa-St Pete, FL, USA?	2021 Delft?, Danang?

### **EU Research Framework Programs MAST I and II (1990-1992-1996)**

While I was comfortably enjoying my sabbatical in Barcelona, Huib de Vriend led in 1990, first six, and then in 1992, eight European hydraulic labs within two impressive EU funded projects, under the so called Marine Science and Technology Programme (MAST), known as G6-M and G8-M; the M meaning Morphodynamics. The G8-M program did not only bring the hydraulic laboratories together, but also institutes and universities, to a grand total of 35 partners.

Then Huib announced mid-1993 his departure to the “enterprising” University of Twente. This caused great panic at Delft Hydraulics and prompted the previously mentioned phone call from Gaele to me in Barcelona. Per 1 January 1994 I returned to finalize the G8-M project for its remaining two years. This was not a difficult task, as the project was beautifully set up by Huib and in

which outstanding progress in our field was reached. In addition, it promoted European research collaboration leading to a strong European network that, to this day, celebrates successes.

### **National Institute Coast and Sea (1993-2007)**

Back to our Government: The National Institute for Coast and Sea (RIKZ) was dear to me. With the conclusion of the Delta works and the closing of the Delta Dienst (Delta Directory), the research tasks of 'Rijkswaterstaat' needed to be revisited. The Delta Directory has been a hotbed and driving force behind a new hydraulic generation. A part of this generation was integrated in the core of the Tidal Water Service (Dienst Getijdewateren) and focused on all salt and brackish water of Netherlands, including the coast. This service changed its name to National Institute for Coast and Sea (RIKZ) in 1993 and was until 2007 one of the six specialised directories of 'Rijkswaterstaat', located in the iconic building on the Kortenaarkade in The Hague.

RIKZ was a very enthusiastic club with experienced figures as Job Dronkers, Luitzen Bijlsma, Rob Misdorp, Jan Mulder, Ruud Spanhoff, Roeland Allewijn and Roeland Hillen and was a breeding ground for the younger generation. They showed that "research pays off!", gave form and substance to the Dutch Coastal Management and were promoters of Integrated Coastal Zone Management on a global scale. Together with Robert Nicholls and Gerrit Baarse I have been able to deliver beautiful contributions to the initiative of ICZM. In the autumn of 2007 most of RIKZ became part of the Water Service and Deltares. I still miss this dynamic club. But ... I am going too fast now! Back to 1994.

### **Creation of NCK (1994)**

Just like the Hydraulic Laboratory director, I too would have been in panic after Huib's announced departure; not only would the G8-M project be without a leader, but Huib was also the dream candidate for the part-time position as professor in the framework of the 'Nederlands Centrum voor Kustonderzoek' (NCK - Dutch Centre for Coastal Research), which was to be set up in 1994.

This post was another not-to-be-missed offer. While Job Dronkers from 'Rijkswaterstaat' (RWS) was appointed in Utrecht, I was honoured to take up the offer in Delft. My boss, Kees d'Angremond, gave me a lot of freedom, which meant among other things, that I was able to introduce a new course "Coastal inlets and tidal basins." If any aspect in hydraulic education was missing, it was the role of tidal inlets and basins in a cohesive coastal system. This was



one of the lessons I learned from the Coastal Genesis research. Together with Zheng Bin Wang, Job Dronkers and Huib de Vriend we have given this course a place in the curriculum.



*[slide 6 Field visit Florida Gulf Coast USA]*

Also, my first master student presented himself and what kind: Stefan Aarninkhof, a phenomena in terms of both content and socially. It marked the beginning of our fruitful cooperation. Together we sensed the spirit of the times and focused on strengthening the Delft profile in conducting field work, in monitoring as well as process measurements. We joined Aart Kroon, our Utrecht colleague experienced in field research, and went on board with Rob Holman, the visionary Oregon State University professor, the father of the ARGUS video monitoring system. The space and time scale with which the coast and the coastal processes could be followed was an important addition to the unique JARKUS file, our internationally unique record of coastal profiles since 1968. ARGUS was also the inspiration for the dissertation of my first PhD student ... you may guess three times who that would be!

### **EU Research Framework Programs MAST III (1996-2000)**

After a long period of uncertainty it was decided in 1996 that Delft Hydraulics (WL) would settle in Delft and so my family moved again, now to Rijswijk.

Many of my close colleagues from De Voorst did not want to move and decided to start-up for themselves, which has led to great companies. Delft Hydraulics (WL) was not very happy, but in the light of valorisation, it was actually quite good. How nice it would be if Deltares would be striving to be an incubator for start-ups and spin-offs.

The many partners who participated in the G6M and G8M projects got the taste of acquiring EU research funding as well. In the period 1993 to 2000 they were successful in 2000 MAST III program with a series of research projects, such as SAFE, PACE and FANS. These projects not only consolidated the network of European researchers, but we could also work together with partners from outside the EU.



*[Slide 7 PACE, LIP and SAFE participants]*

### **New jobs in 2001 (1 October 2001)**

Immediately after the turn of the century two new vacancies came my way; both in connection with the upcoming retirement of Kees d'Angremond. In May 2001 I received from the State Secretary of the Ministry of 'Verkeer en Waterstaat' (Infrastructure and Environment) an honorable appointment in the Technical Advisory Committee on Flood Defences (TAW).

TAW was founded partly in response to the May 31, 1965 breakthrough of an Amsterdam quay at Tuindorp Oostzaan (14 January 1960). The task of the TAW was to give the Minister solicited and unsolicited advice on all technical aspects of interest to the safety as well as the effective design, management and maintenance of the defences in the protected areas. In the beginning of 2005, forty years after its creation, TAW became the Expertise Water Safety Network (ENW – Expertise Netwerk Waterveiligheid).



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*[slide 8 150th TAW WG Coast meeting January 2005]*

A few months ago Stefan – qualitate qua - succeeded me in my role as Chairman of the Working Group Coast of the Expertise Network Waterdefences (ENW). The other vacancy was the Chair that Kees D'Angremond left behind with his retirement. Particularly Arnold Verruijt, Jurjen Battjes and Bill Kamphuis were three important nestors to me, who encouraged me to apply. Although I did not have the record and required skills of the desired profile, I was chosen. The past 15 years I have been able to fulfill this function to the fullest.

### **Viet Nam capacity building (2001-2016)**

A very special additional activity that I have taken over from Kees was the support in setting up an academic curriculum in the field of Coastal Engineering and Management at Thuy Loi University in Hanoi. I started somewhat hesitant, but soon became very excited. What gratification to be able to assist a nation as Viet Nam to build its academic capacity in my field.

Our resident engineers in Hanoi, Michel Tonneijck and GertJan Schiereck, have pulled their weight with the support from the Valorisation Center. Marjan Kreijns of this Center is an absolute star in acquiring, implementing and successfully concluding capacity building projects. The support of the Dutch Embassy in Hanoi has been enormous. The Vietnamese doctoral candidates of the first generation are all involved as teachers and the first has now become Professor.



***Cua Dai Beach, Hoi An, Vietnam***

*[slide 9 Hoi An erosion]*

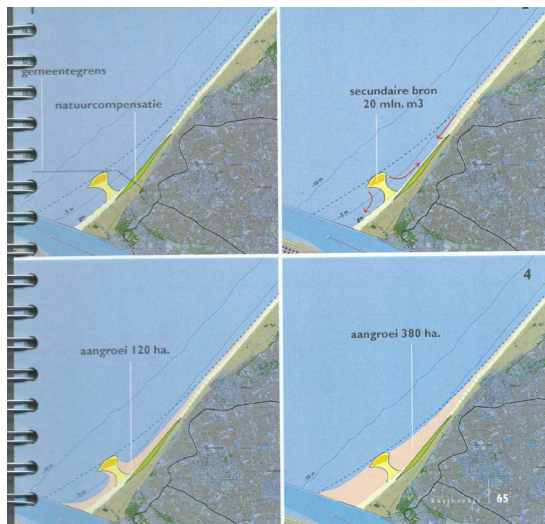
I also learned a lot from this experience and again I have been able to transfer this knowledge to my students. A person learns most of errors, and errors are made in rapidly developing countries such as Viet Nam, especially with a coastline of 3000 km long, a huge variation in morphological coastal types, special tidal effects, a Northeastern and a Southern monsoon time and, not completely in sync with this, a wet and dry season. It is then not a trivial thing to understand what is happening for example along Hoi An's Cua Dai Beach, one of the most famous beaches of Central Viet Nam. Especially if you take into consideration the role played by human actions, such as, river damming, groundwater withdrawal, building on the beach, legal and illegal sand extraction. At Cua Dai beach an attempt is made to curb the enormous erosion

with geotextile bags. Not only does this solution turn out to be very fragile and in the end also very costly ... but a temporary arrest of the erosion just north of the Victoria Resort has led to displacement of the erosion further north.

### Coast booklet (2005-2006)

In August 2000 the Water Management Commission 21st century (Commissie Waterbeheer 21e eeuw) published its advise on the future of water policy in the Netherlands. Incidentally, the near-river flood of January 1995 played the part of the answered prayer. The main idea of the Commission was that water needed more room and needed an organisational principle. The 'Unie van Waterschappen' (the Dutch Water Authorities) endorsed the main principles, including the principle for the implementation of the plans of a combination with other interests, such as nature conservancy, living and recreation.

In order to bring this last principle into practice, State Secretary and later Minister Mrs. Schultz van Haegen presented in the beginning of January 2004 the 'Process plan weakest links of the Dutch coast' to the House of Representatives. Eight priority weak links were selected on which integral planning studies would be carried out under the direction of the provinces. It demonstrates a foresighted, courageous and innovative policy. We will be missing the Minister.



[slide 10 Coast booklet: symmetric Sand Engine]



One of the 8 weak links is the coast near Kijkduin- Hoek van Holland and deputy Dwarshuis of the province of South Holland is the first to acknowledge this. She establishes an Advisory Commission under the leadership of Frans Tielrooij. This Commission was carefully composed, as Mrs. Dwarshuis understood better than anyone else how important it was to have all stakeholders on board. Nevertheless, we, as stakeholders, did not arrive at a solution. Mrs. Dwarshuis and Chairman Tielrooij suggested a working group consisting of 3 members of the Committee, namely Dirk Sijmons, Gerard Loman and under-signed with the task, quoting a Dutch cartoon character: "Tom Poes, make up a ruse!"

One the late afternoon, we arrived at the office of landscape architect Dirk Sijmons in Utrecht ... and even before the pizza was delivered, the principle idea was created. We had listened very well to all stakeholders. No elongated, uniform dunes and widening of the beach, no permanent buildings, but a concentrated mega-nourishment where natural processes would facilitate a dynamic dune and beach landscape. At that moment, what later became known as, - the Sand Motor - was born.

### **Farewell to WL and birth of Deltares (2007)**

In 2007 a special event takes place. Delft Hydraulics, so dear to me, becomes Deltares and, as we speak, now 10 years later, the institute is as solid as a rock. The Netherlands and TU Delft can be proud. I express the hope that a culture of mutually reinforcing cooperation continues to exist between Deltares, TU Delft and IHE. Focus and critical mass are the key words.

### **Delta Commission 2.0 - also known as Veerman Commission (2007-2008)**

Mid-2007 another offer, not-to-be-turned down, crossed my path. The wise former Minister of Agriculture, Cees Veerman, called me. He invited me to join the Delta Commission 2.0, led by him and better known, as the Veerman Commission, established at the request of the Secretary of State, Mrs. Huizinga. A remarkable decision without any flood disaster, but perhaps Hurricane Katrina in 2005 played a role.

This adventure lasted a little more than a year. I will never forget what Cees said at our first meeting, at his and his wife Marjan's welcoming farm in Goudswaard. "We are going to deliver a recommendation which will not die on the book shelf and it will take us not any longer than a year!" The composition of the commission was very special and there was never a dull moment! We had very engaging discussions, which were very well directed by Cees



Veerman. I am aware of the criticism of seasoned Delta engineers. The composition of the commission was obviously far more varied and less technical than the 1st Delta Commission. This apparently still remains some getting used to.



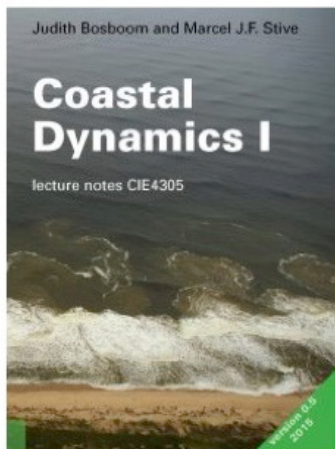
[slide 11 Committee Veerman]

As a Committee we have been assisted by some great minds. My colleagues Matthijs Kok and Bas Jonkman have done an assessment to find if the Netherlands is able to resist, technically and economically, a sea-level rise of 3 meters in the next 200 years. The reply was that with some creativity is very well achievable! Climate experts have advised us regarding a maximum upper- and a minimum lower boundary of the expected sea level rise for the Netherlands.

Following the live broadcast press conference where our chairman delivered the report simultaneously to then prime minister Balkenende and State Secretary Huizinga, there was some commotion about the upper limit based scenario; it would be exaggerated. But looking at recent knowledge it was not so exaggerated after all. I am proud of our result: the recommendations have really been followed.

### Innovation in lectures and field capabilities (2008-2010)

In the years 2008 to 2010 two special opportunities presented itself. Judith Bosboom, a former colleague of WL, came back into the field. This was a welcome opportunity to analyse, evaluate and modernise the lectures and the course materials. Teaching the MSc courses, there is never enough time to improve, even although one starts with a list of changes in one's mind or even on paper. Let alone a fundamental face-lift or a complete reconstruction. Judith agreed to help me. She analyzed three courses in the field of coastal engineering and suggested on the one hand, to integrate, and to modernise on the other hand. The end result are the courses Coastal Dynamics 1 and Coastal Dynamics 2.



Best Lecturer TU Delft 2016

*[Slide 12 Coastal Dynamics 1 and TU lecturer of the year 2016 Judith Bosboom]*

Coastal Dynamics 1, covering the foundational knowledge, became Judith's baby: first she redeveloped the content, modernized the didactical approach and finally brought the assessment to a higher level. Students also appreciated

her effort and expressed this by the fact that Judith was voted best teacher of the MSc Hydraulic Engineering track for 5 consecutive times. And this year, 2017, we as a department and faculty had cause to celebrate, because Judith was voted Best Lecturer of the entire university!

A second chance arose when my newly graduated “surf-dudes” Matthieu de Schipper and Sierd de Vries were interested to expand our field expertise with the help of an instrument equipped jet ski. For quite a while we had been brooding on this opportunity and a great spin-off originated: SHORE Monitoring. The capabilities of the jet ski are nicely described in the a 2011 video about the Sand Motor, which also creates the bridge to the research of and on the sand motor.

*[Video:Public Broadcasting Service USA; in English / 3 min.  
<https://www.youtube.com/watch?v=J0YWob9VnCk> ]*

## Jetski, Wave Droid, Drone



*[Slide 13 Jetski, wave droid and drone]*

### **Sand Motor 2011 and research [NEMO and Nature Coast, BwN MOOC and course]**

In retrospect everything seems to connect so well, but who would have predicted this? I certainly would not! At the end of 2010 I took another stab at a prestigious Advanced Research Grant of the ERC (European Research Council) with the NEMO (Nearshore Monitoring and Modelling: Inter-scale

Coastal Behavior) proposal. In anticipation of the outcome, the sand motor was realized-5 years after its inception. Then, in October 2011, a surprising message arrived from Brussels: NEMO is honored. There was no end to our happiness; the combination fits perfectly together.



Interdisciplinary research project  
Funded by STW  
6 universities, 12 PhDs + 3 postdocs  
Strong involvement of end-users  
Builds on MEP, EFRO and NEMO (3 PhDs)  
International collaboration with universities

*Monitor*



TU Delft



Universiteit Utrecht

*Understand*



UNIVERSITEIT TWENTE

*Create*



WAGENINGEN

[Beeld 14 NatureCoast STW Project]

But, we are still not quite satisfied, as NEMO is rather mono-disciplinary. With Jaap van Thiel de Vries, Stefan Aarninkhof and Arjen Luijendijk we mobilize our Dutch knowledge partners to prepare an interdisciplinary STW proposal. This proposal becomes Nature Coast. Building with Nature thus is put in place ...with a very nice pilot project and room for research. Earlier I told you about the importance of a multi-disciplinary nature of Coastal Genesis as a source of inspiration and its results. I have the same expectation of the research around the Sand Motor. Carola van Gelder has already followed up with the energetic Coastal Genesis 2.0 initiative.

In education this inspiration has led to the support of Ecoshape in the development of two new courses: a very popular MOOC (Online course) "Building with Nature" and a regular lecture "Building with Nature." I want to compliment Jill Slinger for the short time in which she was able to put this together, and thus further developing the cooperation between the faculties TBM and Civil Engineering.

## To conclude

It's time to conclude. I sincerely hope that Stefan and I have inspired and energized you.

Of course there is much more to be said and there are so many more people to whom I am grateful and whom I have not mentioned by name. I hope you will forgive me and that I can make up for it by saying that my speech was not only about me, but also about you, including my visionary bosses, my many fantastic colleagues and staff at my two illustrious employers, my special national and international colleagues and the many creative students I have mentored.

I am grateful to have so many international friends here at my farewell address. I want to thank you for your amazing collaboration, friendship and for being here.

My wife and my three sons have always been understanding of all Dad's hobby. They have always supported me. Life is not always rosy, but that is part of life and makes it worthwhile.

Finally, the biggest compliment I've ever gotten was from Paul Visser, the nestor of our Department. Paul told me that in the 40 years that he has been involved in our Department, the atmosphere has never before been so good. My motto was the motto of Steve Jobs: *"It does not make sense to hire smart people and tell **them** what to do; we hire smart people so they can tell **us** what to do."*

I have spoken!





