

Jasna PRPIĆ - ORŠIĆ

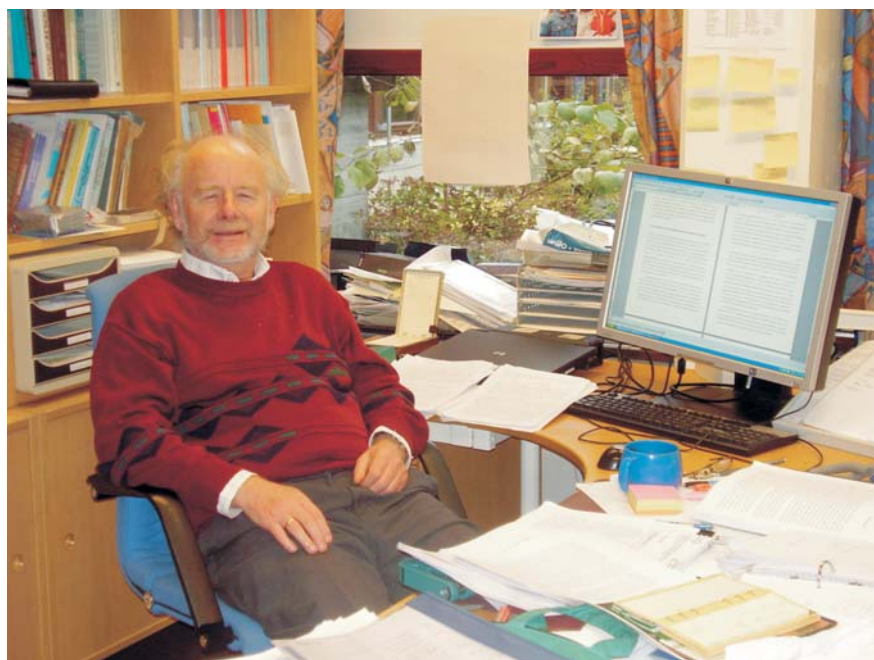
You should never say something about something that you don't know anything about

Interview with Professor O.M. Faltinsen, *Centre for Ships and Ocean Structures*, Trondheim, Norway

Recently I was invited to stay for two months in Norway at the *Centre for Ships and Ocean Structures (CeSOS)* which is located at the *Marine Technology Centre (MTC)* in Trondheim. The *MTC* also houses the *Department of Marine Technology* of the *University of Engineering Science and Technology*, as well as the *SINTEF* research institute *MARINTEK*. This location ensures a unique environment for researchers, with access to extensive laboratories, library facilities and other infrastructure.

Since its foundation in 2003, *CeSOS* has developed into a centre with about 80 full or part-time researchers with different educational and cultural backgrounds, half of them from outside Norway. In total, their work represents some 50 man-years annually. The main challenge is to balance the need to reach the goals with that of allowing researchers the freedom for creativity.

A key issue in *CeSOS* strategy is the interaction between researchers with not only different educational backgrounds but also different specialisations in hydrodynamics, structural mechanics and automatic control. Professors Odd M. Faltinsen, Thor I. Fossen and Torgeir Moan coordinate the work in hydrodynamics, automatic control and structural mechanics, respectively. Responsibility for the scientific content is to a large extent delegated to



Professor O.M. Faltinsen in his office

key persons, within the framework of their overall goals and plans. This also includes responsibility for publication in reputed journals and other media.

The role of the director (Professor Torgeir Moan) and the other two discipline coordinators is to ensure quality of each project and also to ensure that it is in accordance with the Centre's overall plans. A simple organisational structure - based on the director and discipline heads as coordinators, and with key persons taking the main responsibility - gives the best ba-

lance between flexibility, goal-orientation and the final outcome.

CeSOS aims to create a daring, demanding and dynamic environment for research and development. At the same time, an important issue is safety, health and the working environment. This provides a framework to ensure physical and mental well-being and safety, especially in laboratory work, and the positive atmosphere of a successful organisation.

The Centre has succeeded beyond expectations in attracting funding in ad-

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dition to that contributed by the *Research Council of Norway* and *Norwegian University of Science and Technology*, and in producing excellent scientific results.

Two Croatian researchers were also a part of *CeSOS* as PhD students during the past five years and recently got their PhD degrees there. Dr. Damir Radan got his PhD degree with the doctoral thesis *Energy Management of Marine Electrical Power Systems – Control of Integrated, Autonomous Power Systems*, under supervision of Professors Ådnanes, Sørensen and Johansen. Now he works at *Acery Group* in Stavanger. Dr. Renato Skejić is currently working at *MARINTEK* in Trondheim. He obtained his PhD degree in June, under supervision of Professor Faltinsen. I had a pleasure to attend the successful defence of his doctoral thesis entitled *Manoeuvring and Seakeeping of a Single Ship and of Two Ships in Interaction*.

I also consider myself very lucky to have been able to get a chance to be a part of *CeSOS*, although for a brief period, and to work with Professor Odd Magnus Faltinsen. His work in the field of hydrodynamics of ships and sea structures is worldwide known. He is the author of some 300 scientific papers, two great books, he has been a supervisor to more than 40 PhD theses and with his achievements he has left an indelible trace in this field. He is a member of academies in Norway, USA and has been recently appointed academy member in China also. But what fascinates me most about Professor Faltinsen, besides his huge knowledge, are his remarkable human features. Despite of the planetary status he has retained his simplicity, modesty and kindness, and good humour all the time. For me working with him was a great privilege and pleasure and I carefully cherish the memory of each conversation we had. After I worked with Professor Faltinsen for a while, encouraged by my friends from the Editorial Board of *Brodogradnja* journal, I asked him for a permission to record part of our conversations in order to publish it as an interview afterwards, and he agreed. Here is the result of it ...

BRODGRADNJA : *You are one of the most famous world hydrodynamicists and since 1970 you have been giving continuously enormous contribution to marine hydrodynamics. But you have become worldwide famous very young by deve-*

loping the strip theory with Professors Salvesen and Tuck. At that time Prof. Salvesen lived in America, Prof. Tuck was in Australia, and you were in Norway...

FALTINSEN: It was not completely like that. It was like this: after I finished my master's degree in applied mathematics at Bergen I started working in the research department of in *Det Norske Veritas* (DNV). At that time Nils Salvesen had a leave of absence from his job at the *David Taylor Model Basin* and was then in DNV so we started to work together on the strip theory. Tuck had been already working on this, I believe at the *David Taylor Model Basin* with Nils Salvesen. He had been working on the formulation of the equation of motions; there was a theoretical report and computer program in which Frank (Werner Frank, author's comment) was also involved. What I did then at DNV was to generalize these equations by including loads, which is a prime interest for a classification society. Also, due to bad roll predictions I incorporated empirical formulae which were developed in Japan. Also, as a very natural thing to do I included so called end terms in the equations of motion.

BRODGRADNJA : *You were very young then... It was your first paper?*

FALTINSEN: Yes, I was very young. In my master's thesis I was doing acoustics and then this was presented as a paper and maybe that was the first paper, but actually the paper about strip theory was my first paper in this field. We did a lot of investigations, which was part of the paper, in order to validate the method. Nils Salvesen did the major task in writing this paper. He is extremely good in formulating and also he was guiding me in general. You see, I came from applied mathematics and I had to learn those things. Well, how old was I? I believe ... I have to think...

BRODGRADNJA : *Twenty six?*

FALTINSEN: Yes when the paper was presented, but when I started at DNV, that was in 1968, I was then 24 years old and, well, you may say that it is just by chance that I went into this field. After I took my degree in applied mathematics I wanted to work with something which was more real world. I could work in quite different fields. Actually, I joined a very good group in the DNV research department where the leader of the group was Nordenstrøm. At DNV they know what they want, they

want a product and they are supposed to do services, but still they did not require delivering it yesterday. They were patient relative to that, and generally speaking, I think it is an extremely important part of all applied oriented institutions that one should allow people, some people, not everyone, to work with a longer perspective, let's say at the order of a year or so. But I should be very clear, you should create a product, because that is the applied research of industrial companies, but I think that in our field you don't see that in many places. For me DNV had a very clear policy about having a research department. Nils Salvesen got me to go to the USA to take PhD degree, but afterwards, when I came back, I continued to work at DNV for a couple of years. Then I got a position here at the university and then also I was working on similar types of projects.

BRODGRADNJA : *Today, the strip theory is still widely used. How do you explain that in spite of very fast accumulation of knowledge and rapid development of computers capabilities this theory still survives?*

FALTINSEN: You may say it like this: the more you know the more complicated you would like to be. I think that it was advantage that at that time I didn't know too much. There are several reasons why the strip theory is still widely in use according to my opinion. First of all the strip theory would not be good when the frequency of encounter is very small, but in that case the problem is quasi-static and the hydrodynamics is not so important. The other aspect of it, I believe, is that global seakeeping predictions are not so sensitive to the details of the hull form as for instance the wave resistance problem. So, I think it is partly luck that it works and that is one aspect. The other aspect is related to the fact that you can use linear theory for much higher wave conditions than you may think in reality. There has been a lot of effort related to having the Green function type of method in three dimensions, but it is extremely hard to calculate and it is very sensitive numerically. Even when one is able to correctly make these calculations you don't get that much difference in results and then you don't want to make that effort. I have been a lot involved with the ITTC (*International Towing Tank Conference*, author's comment), for three periods I was involved with the Seakeeping Committee and we

did a lot of the comparative studies and then it turned out like the following. You had what is called unified theory which was developed by Nick Newman and, for sure, that type of theory can predict more accurately and then in the broader frequency range, which are the added mass and damping coefficients. But you are not really interested in added mass and damping, you are interested in response. When you have a situation where you are in a resonant condition of heave and pitch, the relative motions are relatively large at head sea and with forward speed and in experimental studies you even may have green water, so it happened that the strip theory may give better results than the unified theory. What is really needed is a method that can predict really extreme type of situations where you have green water on deck and slamming incorporated in your calculations but it is extremely hard to do it. It is very demanding task to do. Also, we must not forget that it is extremely important to make simulations in a seaway because you want stochastic result, in a stochastic sea. You want to make long term prediction and so on. And then following straightforward with CFD (Computational fluid dynamics, author's comment) methods is out of the questions but of course you can be smart and then have different type of procedures. To conclude, I think it is partly luck and you don't have to cite me but I often say: *Some people believe in strip theory like some people believe in God.* It is a religious aspect related to it. Of course, we must not forget that this type of analysis is made for operational studies and is useful for structural people, as long as they can get some useful values of it. Of course, it is not perfect and you can generalize the strip theory to different problems like whipping or springing. It doesn't predict that kind of effects so accurately. The other issue is related to what you are working on - the added resistance. For example you have Gerritsma & Beukelman's formula which is very simple and you may want to make it more complicated if you want to, but it works as long as you are in the wavelength regime where you have significant ship motions. Also similarly I was working on low wave length type of theory. It is very simple and that is also working. So the success of the strip theory is a mixture of luck and a mixture of that you don't know too much. If I had known much more then, I would have made it much more complicated.

BRODØGRADNJA: *You have written two very famous books "Sea Loads on Ships and Offshore Structures" and "Hydrodynamics of High-Speed Marine Vehicles". These books are widely used in education of students worldwide. The first one is translated in Korean and Chinese and "Hydrodynamics of High-Speed Marine Vehicles is translated in Chinese".*

FALTINSEN: One of the reasons why these books have been translated into Chinese is also the fact that we have many Chinese students and we see that they have limited background on sea loads which is very important if you deal with offshore structures. The development of the first book is a long story in time starting from when I was employed by the university in 1974 and I had to develop lecture notes related to offshore. When I was at the MIT (Massachusetts Institute of Technology, author's comment) in 1987-1988, Nick Newman encouraged me to write a book as an editor of the Ocean Technology Series of Cambridge University Press. After I wrote that book I told to myself I should never more write books. One cannot imagine how it is because you must continuously control and control. You must create a lot of examples without errors and you must create exercises and so on. It is a full time job. So I said that to myself then. When CeSOS started in 2003, we defined different objectives. One is to publish in journals which have very high standard. But I said that one objective also should be that one should try to write books. When I said that then I must do it. Once more I had some material which I used as a part of seakeeping course I had been giving. That was a start, but I had to do a tremendous job because I created the title which was very demanding, and that was "Hydrodynamics of High Speed Vessels". I can't just talk about seakeeping. That means I must talk about all aspects, but I had a very important school for me - I had learned a lot by being a member of committees of the ITTC. I was the Chairman of the High Speed Committee so then I learned a lot about all aspects of it. At that time we had a project in Norway about high speed vessels and we started this FAST conference and there were a lot of materials which I have been used. Writing a book like that it means that I learned a lot myself because you must study all different aspects of it.

BRODØGRADNJA: *You are writing the third book about sloshing... can you tell me something about it.*

FALTINSEN: As you know, I am writing a new book and now I feel trapped, because first it was planned that there would be three authors, and now it turns out that there will be two authors. I didn't think that I should be involved so much, because originally there should have been more authors, but it takes tremendous time. I have been working together with Oleksandr Tymokha a lot about theoretical aspect of more analytically oriented methods. But, in my opinion, it becomes too narrow to talk just about that and then one has to make this scope broader and also make connections to other engineering fields where sloshing is important. One topic which we don't cover is space application. There has been done a lot related to space application, but the reason why we don't cover it is that it would imply situations where you don't have gravity and other physical effect matter. So we don't cover that and there is a very good book by Abramson which I think is very useful in that area. But once more, writing a book means you have to create lot of examples and you must create exercises. One important aspect is control but it must also be understandable. I understand this topic, but I am not writing a book for myself and I must test it out. I have many students and they are helping me in reading and solving the problems, controlling the errors that I am making. I make examples and there is always a bug. Therefore, I have a big network of people who are involved in the books, locally but also internationally. I have colleagues whom I am using in reviewing the book like for articles. All these books are published by Cambridge University Press which I have a very good experience with, also the last book which is supposed to be delivered by the end of this year. It is planned that this book will also be translated into Chinese. The Jiaotong University in Shanghai will be involved in this and they, of course very professionally, used a lot of students to translate the book but then they control on higher level with professors having detailed knowledge in the field. I can't control what they are writing, so top persons which are very good people have been involved in real quality control of the Chinese version.

BRODØGRADNJA: *You are a member of three Norwegian academies: Norwegian Academy for Technical Sciences, Norwegian Academy of Science and Let-*

ters and the Royal Norwegian Society of Sciences and Letters. You are also a foreign member of National Academy of United States of America and, recently, you are elected member of China Academy.

FALTINSEN: In Norway we have different kinds of academies. Only one is purely in technical sciences. I became a foreign associate of the National Academy of Engineering of the United States of America, Academy in USA in 1991. Then recently I have become a member of the Chinese Academy of Engineering and I was there at the end of June as you know. First of all, there are not a lot of foreign members, only 34 totally in all fields. The number of the Chinese academy members may be of the order of seven hundred let's say in all fields but foreign members are very few. In naval architecture and related fields there are only two international members, I believe. There is a very big difference in how the academy there is working compared to Norway. They have much more direct contact with the government and the members have a very high position in society. What also surprised me, when I was elected member, the Chinese Ambassador invited me with my wife for a dinner. She has been visiting me afterwards and she tells that being a member of that academy has very high status in China. When the ceremony was there the President of China and a large part of the government and important persons were present. For sure it is not the same in Norway, it is far from that, here it is a separate organization. I believe that in the USA they also have much more influence than in Norway. Although they are not part of the government, they help the government in some sense. It was, of course, a nice experience for me. Members of academy in China have so many privileges. But I don't have them they told me, but I don't want to have them either, that is so.

BRODOGRADNJA: *How does the Norwegian shipbuilding industry survive in these days and what kind of ships do they produce? I am asking this because in Croatia we are continuously listening that the shipyards are not profitable and that they should be closed or should produce other things? How do you see the future of European shipyards?*

FALTINSEN: Well, I can go back to that when I was elected a member of Chinese Academy. I don't know why they needed

to say this to the newly elected members, but it was like the following: *You should never say something about something that you don't know anything about.* And I agree with that. I don't think I should misuse the title, I should really not say anything concrete about the shipbuilding, because what I am saying I have not background for saying it. I would rather take a longer perspective of it about what can happen but then it depends on the country and on that what kind of maritime field is important for the country. For me it is very important not to narrowing down what is conventional type of ocean application. For me it is a broader aspect, but I am at university. Also, I don't know much about Croatia, but I can say for Norway, here the maritime field is very important. For Norway it is characterized by three major applications. One is related to ship transportation, but when it comes to shipyards they are more specialized in Norway. Then you have companies like DNV which is international, and as major fields you have ships and ship transportation. Then we have offshore, you don't have that in the same extent in Croatia I guess. Fishery and aquaculture is also important for Norway.

BRODOGRADNJA: *We have long tradition in shipbuilding; it is a common opinion that we should tend to build sophisticated ships because otherwise we can't compete with Korea and China.*

FALTINSEN: It is very simple, if it is very work intensive and you can't do this type of jobs automatically, you will go to the cheapest country and that is what has happened. When I was a kid then in Stavanger, in the city where I was living, there was a very big shipyard which was building very big tankers, the biggest in the world I believe. But then this market disappeared from Norway. Then Japan was the major country for this kind of jobs but they also had a problem with Korea. I am sure that we can not compete if it is a question of price and heavy use of labour. But you have for example Finland where they have been specialized for very long time in cruise ships and that has been a very big market. I guess it will continue to be so. It is also a question of other fields of use of the ocean. If you look at Japan, they have been trying very hard to go to other fields. They had very big research project on VLFS (Very Large Floating Structures, author's comment) related to floating air-

ports and they did a lot of serious work in this field. The shipbuilding industry was involved in it but I am not sure what the current status of it is. Norway was lucky you may say because they found all that oil and gas and that industry is very big and advanced and the marine technology field is only one part of it. Then Norway is a very big exporter of fish products and you have a lot of projects with aquaculture. What I have been told is simply that there is not that much marine technology in aquaculture as long as you are in protected areas. It is more biology and things like that, but then it is a question of limited place inshore and maybe in the future they will go offshore and then you have the same type of problems. Also, I have been involved in more specialized type of problem that has to do with floating bridges. There are some floating bridges in Norway but I wasn't involved in that, however, I was involved in some plans to build submerged floating bridges. It has never been built, but it has a lot of advantages as I see it. I don't know how big this market is to be more specialized in reality. Once more, I am not talking about Croatia but I am talking about the general trend. The other dimension is that you have all that development related to oil and gas in the northern part of Europe and also in Russia of course. We have global warming and one is thinking about that there might be traffic from Europe to Asia open from ice. That creates a new dimension related to the ice technology. Then also as a consequence of energy crisis everything dealing with renewal of energy is interesting, wave energy, and in Norway there is an oil company that is involved in plans for floating wind mills providing energy to platforms. The platforms are creating a lot of CO₂ so if they can get energy like this it would help. I think that it must be fair to say that wave energy can never cover everything, it must be just a supplement related to it. It is also interesting to see how history is repeating itself. I was involved in similar type of questions in the 1980s because then you also had an energy crisis. And then it disappeared. And now it comes back again. I think one should have much more continuing efforts related to it. I had to make a speech to the audience of about some thousand people when I was at the Academy of Engineering in China. I talked about challenges in ship and ocean technology. I think what is important is first to have a vision, a vision

of 20 years. How are we going to use the oceans? That vision is not very good for shipyards which are fighting for survival, but one needs to have a vision. That might be wrong, but in my opinion one has to think like that and then can look into different types of scenario. I had a visitor in the spring, a representative from Japan. They make visits to different places in the world and they ask questions like that. They were supposed to have ideas about what are the different alternatives for the future and I don't know if their report will be open, but anyway what I basically said to them was that I used my presentation for the academy as a basis. They asked me many questions and I said that I can't answer all of it. For instance questions on transport capacity which is not my field. I can have some opinion about it but other people can have an opinion and we have to try to put that together and see where we are going. But it seems so logical that one has to think broader than conventional ships and I think, for sure, that has been the strength of our department here. We are lucky once more because this department has been dying as many west European departments in naval architecture. I mean they are not dead but they have declined severely because they reflect industry, but it is not like that here. I have heard that this year we are starting with over hundred new students in naval architecture or in marine technology. And they are top students, which means they are interested in that. I am talking about Norwegian students; in addition we have an international master program.

BRODGRADNJA: *In Croatia young people are not so interested in the study of naval architecture although they have good job opportunities after graduation.*

FALTINSEN: Maybe they associated that with something which is not high tech. When you set up a curriculum for naval architecture you must not operate like it had been 30 or 40 years ago. I mean one aspect has to do with automatic control. We have a professor in this area and that has been a very strong subject for electrical engineering. A part of what they are doing has been related to the marine field and I think one should also think about a new type or more advanced type of activities which are needed.

BRODGRADNJA: *How should we educate a "modern engineer"? What does*

in this context mean the development of CFD, the CFD application in design offices? What are, according to your opinion, the knowledge and skills that a modern engineer of naval architecture should acquire during study?

FALTINSEN: So I think what is very important to acknowledge is that no person can know everything within naval architecture, but if you talk about advanced material, then you must have specialists. However, the major challenge is communication and team working. That is a very important aspect. Communication means also that you can understand each other, for example, when I am talking with a specialist in automatic control. Cybernetics is not in naval architecture traditionally, so they have their own language. I think one would benefit from the communication. You need specialists but the very big danger is, of course, that you get so many specialists which can't communicate with other specialists. So I think that a naval architect is not supposed to know everything of course. It is a tremendous field. At our department we have marine engineering, ship design, hydrodynamics and structural mechanics as examples of important fields, but it is difficult to have a very good basis in all that. Our department is divided into two groups. Students select one of these groups at a later stage. One is, I belong to this one, hydrodynamics plus structural mechanics, it also involves marine cybernetics and there is also a professor in nautical studies. We have a special program in nautical studies. That is not a big activity here and that type of job was created because of education of officers for the field, but the tendency is that this type of schools disappears in Norway and the ship owners use foreign people instead. So that is not that big market. But for sure in marine cybernetics you have a lot of industry related to equipment onboard ships and they are involved in, and as I said, most of them are not educated from us. So how do I see CFD in this context, you asked. I guess I said that when I had a lecture down in Zagreb (at the Croatian Academy of Sciences and Arts in spring of 2007, author's comment). It is of course useful, but a big danger one is doing is to believe only in CFD. One advantage is the ability to do the 3D modelling of a system. This could be also done with analytical means, and another aspect is experiment, and the third aspect is CFD. One needs all of them together,

but I think it is important that students get knowledge about CFD. We have course in CFD at the fifth year. They don't learn too much relative to it, I think it is important to learn what limitations and capabilities are related to doing that. There has to be a balance, it cannot be like you are only making input and getting output and don't know what it is. I mean, you have an answer but how true it is in reality. It depends on the field of application, I mean. If you talk about ship hydrodynamics there are cases where CFD is very good, but it is very hard in seakeeping world to do calculations like that. If we go back, that is also why strip theory survives. But then I always say if you are designing a new structure you must do experiments. Once more, I was heavily involved in the activities of the ITTC, and going back many years, at the ITTC they were afraid they were going to loose relative to CFD, but they have not lost. I think there is a still big market and they are building new testing facilities, similar like we have here within the ocean environment laboratory, a big basin which is 50 m times 80 m. That type of laboratory you have also in Wageningen. Also, in November there will be an official opening of a facility like that, I believe, in some aspect has more possibilities than one in Wageningen, at Shanghai Jiatong University and they are also building one at Harbin Engineering University. Seen from the university point of view, I see the clear advantage, like we have also here, in very small facilities, very specialized type of facilities.

When you talk about educational program then I think that the ability to try to solve new problems is very important and that is of course very demanding. If I go myself back when I started I didn't know what problems I was going to work on. Suddenly there was a big interest in high speed vessels. These problems are very unique. It is very hard to let the students be able to solve completely new problems in a 5-year study. In hydrodynamics what we had been trying to do is more to try to simplify the problem. But still it should not be too simplified, so that it doesn't give relevant meaning. I think one learns much more by simplified models. You can do a simple model and do seakeeping analysis. OK, it is far from perfect but I think you get more insight and then you come for a new system whatever it is and then you may be able to deal with wave energy problems, you can deal with fish

farms or you can deal with a harbour or whatever. Of course, in practice you must have software and experimental facilities, but for students it is important to get understanding through simple models. That is also important when you are going to check the output that you get from CFD or from testing facilities.

BRODØGRADNJA: *I am witnessing here very devoted attitude towards science. How is research work in the CeSOS financed? I see many PhD students from whole world working here, how are they financed ... by the government, by the industry or mixed?*

FALTINSEN: It is mixed. The CeSOS is financed by the National Research Council. They decided that they should have a limited number of centres of excellences. They get that money from the government but it is a separate organization. So, in some way you can say that it is the government. When you have this money, then industry also supports it when it is in the engineering field. Who is involved now is oil industry, now it is only one oil company in Norway, and that is StatoilHydro. Then DNV also provides financial support and MARINTEK as well. The budget is about 40 million NOK. I don't have the exact numbers, but let's say is fifty- fifty between industry and Research Council. Also, the university provides extra money, extra support, you get extra positions from the university. The objective of CeSOS is to do fundamental research which is relevant and I have to deal with something that has marine applications. Our product is to publish; our product is not making computer program that should be used by the industry. Besides, we are educating people to get PhD level and those people then go out to industry.

BRODØGRADNJA: *You have here more than 50 PhD students. What possibilities of employment they have after achieving PhD level in Norway? Does industry appreciate the PhD level?*

FALTINSEN: Their opportunities in industry are big. It doesn't mean that they do research there. If I look at my PhD students, some of them for sure have gone to DNV, MARINTEK like Renato (Renato Skejic, author's comment), engineering companies involved in offshore types of activities, some of them are professors here but there are very few of them. The major part is not here and my impression

is that they generally have good possibilities and then, of course, they will not do research where they go but they can be hopefully involved at advanced type of projects. That has been very fortunate also for our MSc students. Generally speaking, there has always been good market for them. There have been bad times in general but still, I think, they always manage to find a job. The maritime industry is for sure very broad here and it means a lot for the Norwegian economy.

BRODØGRADNJA: *Behind yourself you have enormous job and achievements: about 300 scientific papers and almost three books, more than 40 doctoral theses. What it next?*

FALTINSEN: I don't know. If you ask my wife, she will say I should retire. Generally speaking, I have activities in the centre here and now I am sitting and writing books. I think I am working too much. I am not stressed, but I don't think is healthy to be too single minded. I don't know what is next but in general what fascinates me are new topics.

BRODØGRADNJA: *What is the best part of the work you do, the part that gives you the most satisfaction? Conversely, what is the downside of your work?*

FALTINSEN: Well, I like very much to teach, I mean teaching at different levels. I like to stand and lecture to students, but I don't want to teach the same things for 30 years. So, I try to get involved in new things. I like very much to be involved with students. A certain thing one has to do, but I am not doing it now, is that one has to be involved with administration and I like that too, you see. But you must select, I think, you cannot do everything. And what I dislike relatively to that is that is the tendency for too many meetings. So, my attitude is that meetings should never last, let's say more than one hour whatever. Professors are so talkative and they are often not result oriented and I don't like meetings. I emphasize very strongly that meetings should not go on very long because they are not productive. Then, I could very well say that I would not like to sit

down and grade 100 or 200 exams, but I don't do that, I am not involved in that. What is fascinating for me, as I said before, are new types of problems. I like to do new type of things and also I think I still can learn many things. Our centre is for ten years and now we have 4.5 years left. The idea is that afterwards you have to create something new, so this is not forever. Maybe it is a good idea, because otherwise you take it for granted that you have all that money. So, you have to create something new. For sure, I would never like to sit down and do a lot of calculations with some standard programs as a consultant. People may call me for consulting; I would never do that type of jobs because that type of jobs is done by MARINTEK. However, I can be involved as a specialist in one- or two-day type of projects, because you get lot of insight by doing that. It is a question of making priority, for sure. But then I like to joke, you see. People want me to do certain type of things and they tell me: *You just say the amount of money and we will pay.* And I say: *I don't want that, but if you can give me one hour more every day so I have 25 hours to work then I will take the job.* You don't have a job at university if you are interested to be very rich, I don't think so. By working at university you have very big freedom. I have had, but not anymore, many sabbaticals. That has been very interesting because you learn different societies. I have been at the MIT then in Japan and so on, so I have the freedom to do that. You can misuse that freedom, but if you use the freedom in positive way, than it's very good.

BRODØGRADNJA: *Professor Faltinsen, thank you very much for your time. It was pleasure talking to you.*

Trondheim with the Marine Technology Centre in the foreground

