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**Fishing gear**

# RESULTS AND EXPERIENCES OF THE COOPERATION BETWEEN THE DEPARTMENT OF FISHING TECHNOLOGY OF THE UNIVERSITY OF ROSTOCK AND THE DEPARTMENT OF FISHING TECHNIQUES OF THE UNIVERSITY OF AGRICULTURE IN SZCZECIN

# WYNIKI WSPÓŁPRACY NAUKOWO–BADAWCZEJ POMIĘDZY SEKCJĄ TECHNIKI RYBOŁÓWSTWA UNIWERSYTETU W ROSTOCKU I KATEDRĄ TECHNIKI RYBOŁÓWSTWA AKADEMII ROLNICZEJ W SZCZECINIE

**University of Rostock, Germany**

The paper presents the scope of collaboration between the Department of Fishing Technology, University of Rostock and the Chair of Fishing Techniques, University of Agriculture in Szczecin in scientific research and in exchange of students groups, lecturers, and publications.

## INTRODUCTION

First of all I'd like to express my gratefulness for inviting me to take part in the symposium on the occasion of the 30th anniversary of the open–water test station Ińsko.

At the same time I want to offer my congratulations to the scientific and engineering results produced in these thirty years. Now it has been a period of ten years that both our institutions are connected by a creative and successful scientific–technical cooperation having been and still being of high benefit for both partners. This cooperation includes both research and teaching. Please, let me draw your attention to some of the result obtained.

## RESULTS OF THE COOPERATION IN THE FIELD OF BASIC RESEARCH

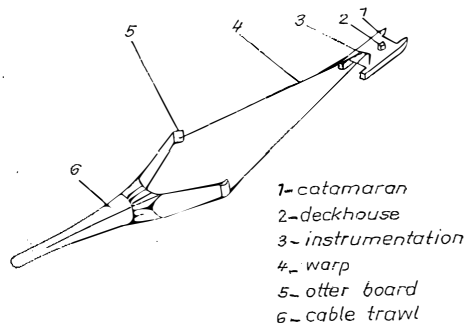



Fig. 1. Scheme of arrangement of the open–water test station Ińsko

The first common investigations are dated from the years 1979. It was the aim to investigate which hydrodynamic tensile forces are acting on trawl nets in non–uniform motion. In Fig. 1 the test arrangement is shown schematically. In the next figure the results of comparative measurements applying a cutter trawl model are presented (Fig. 2; mesh net). These comparative investigations led to the conclusion, that one can base on the fact, that the acting hydrodynamic tensile forces are small in the range of the accelerations occurring in practice and that the most important effect on the acting forces is caused by shape variations of the whole system due to changes of speed.

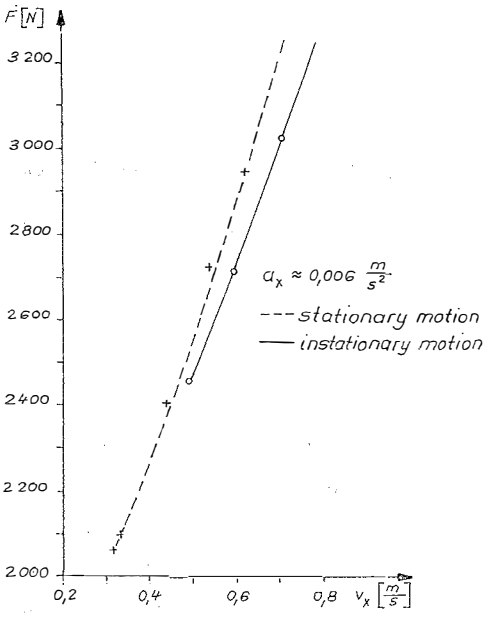



Fig. 2. Approximation of the resistance of a mesh trawl

Experimental investigations carried out at the Ińsko test station in 1985 were of great importance for testing mathematical models reflecting the trajectory of motion and the forces during aimed fishing with pelagic trawl nets. In Fig. 3 the test arrangement is shown on principle. Some of the problems arising were to develop a testing methodology and frictionless topping blocks which allow to measure tensile forces during heaving and veering (Fig. 4). In Fig. 5 and 6 some examples of results obtained from such measurements (heaving manoeuvre) are compared with data calculated applying a mathematical model. The comparison definitely confirms the practical applicability of the developed mathematical models.

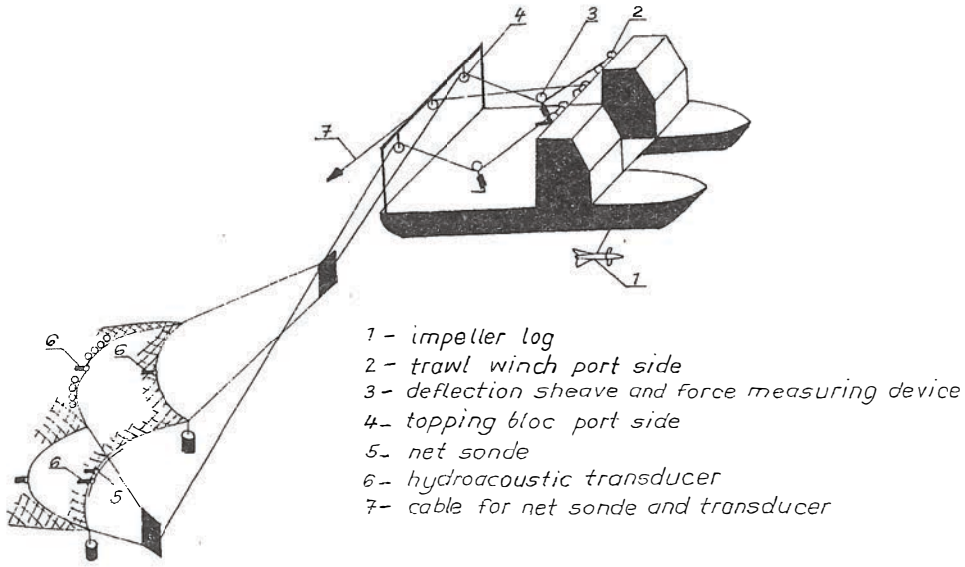



Fig. 3. Scheme for testing a trawl in the case of instationary motion

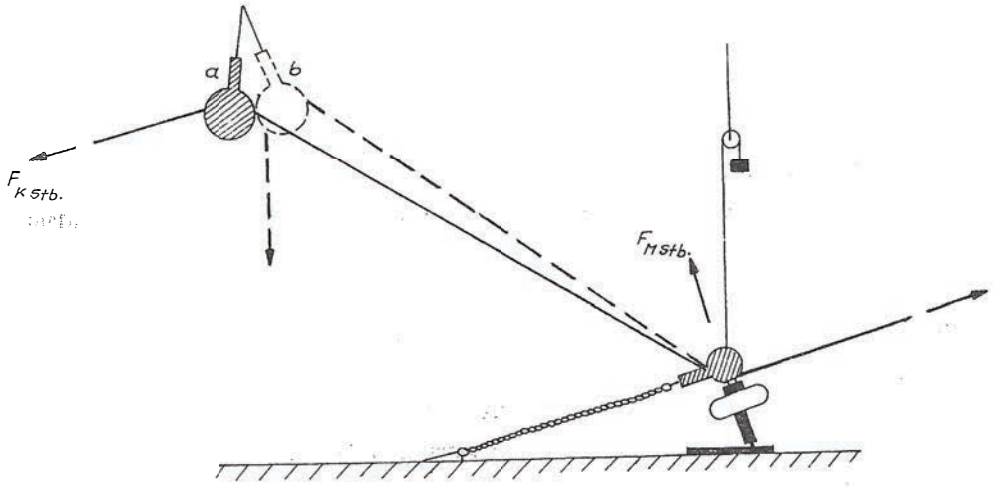



Fig. 4. Force measurement equipment (starboard side) in service position (a) and in calibration position (b)

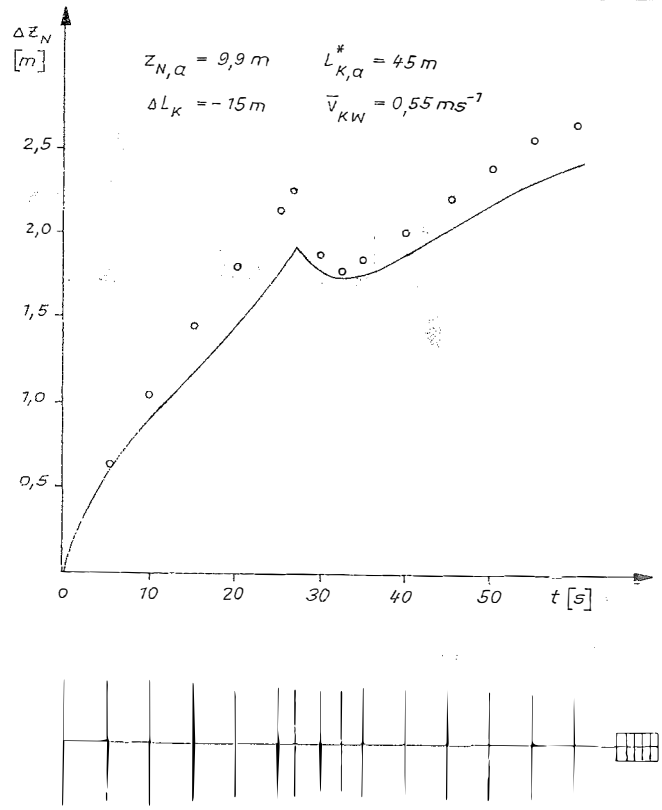
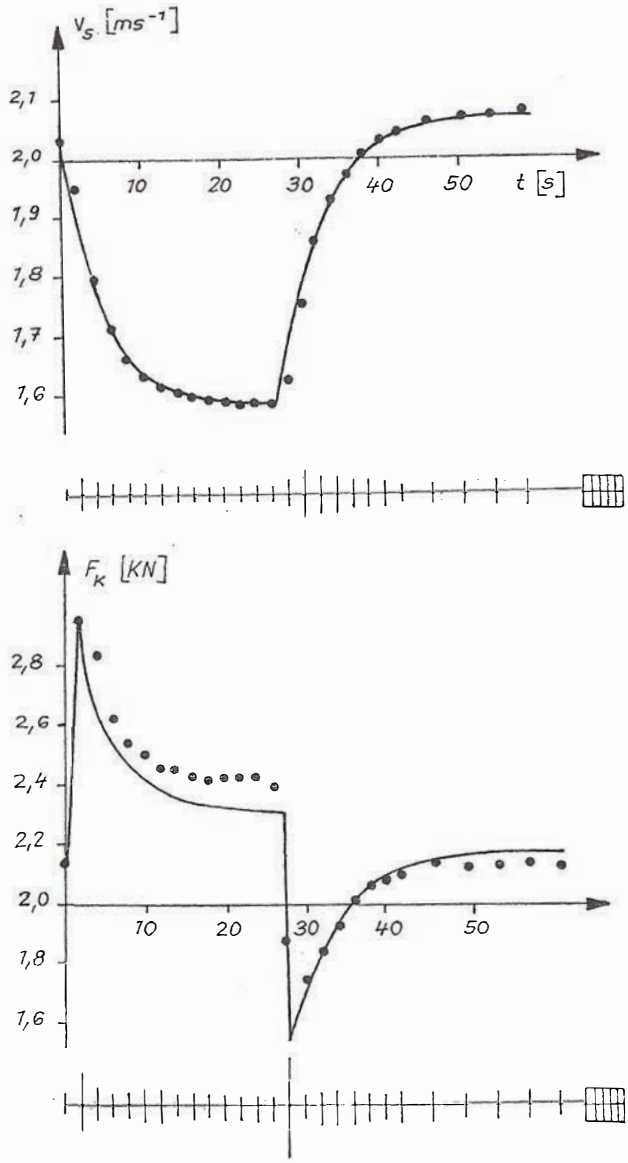



Fig. 5. Alteration of the trawl depth due to hauling–in manoeuvres versus time

In 1987 model investigations have been carried out for experimentally assuring the results of theoretical investigations on static's and dynamics of pelagic otter boards. Main special tasks were the first determination of three angles for determining the otter board's position (angle of attack, trimming and heeling angle) and investigations on the dynamic stability of the otter board in the towing system with varying otter board fixation, varying ship's speed and different otter boards.

Resulting from further mathematical processing of these measuring data e.g. the resistance of whole fishing gear, the otter board spread and the fishing gear's resistance related to the net's intake area can be given.




Fg. 6. Alteration of the ship speed and the warp tension due to hauling–in manoeuvres versus time

In Tab. 1, an example of such measurements is presented. Particularly for these investigations a special measuring instrument with cable has been developed in order to measure the three angles of otter board, which can be regarded as an international novelty. Together we are now trying to develop the transmission of measuring data without cable.

**Table 1**

Measurements of otter board position in space [intervals of the measurements – 5 sec; total time – 150 sec; results of measuring on polish trawl model; polish otter tboard model with and diskes; scal of the model – 1:7; speed of the model about – 2.2 m/sec]

| LP | v | α | β | R1 | R2 | RX | y | z | AB | CD | A | Q | WA | WT | WK |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | m/s | grd | grd | N | N | N | m | m | m | m | | N/m | grd | grd | grd |
| 1 | 2.20 | 122 | 177 | 1680 | 1560 | 3165 | 12.8 | 6.6 | 2.2 | 6.0 | 13.4 | 236 | 40 | –7 | 6 |
| 2 | 2.18 | 118 | 177 | 1720 | 1720 | 3362 | 12.4 | 6.6 | 2.2 | 6.0 | 14.4 | 251 | 39 | –7 | 5 |
| 3 | 2.22 | 117 | 178 | 1670 | 1750 | 3342 | 12.3 | 6.7 | 2.4 | 5.7 | 13.5 | 147 | 39 | –8 | 6 |
| 28 | 2.20 | 120 | 181 | 1700 | 1750 | 3369 | 12.6 | 6.8 | 2.4 | 5.8 | 13.7 | 245 | 36 | –8 | 5 |
| 29 | 2.25 | 122 | 182 | 1640 | 1580 | 3143 | 12.8 | 6.9 | 2.2 | 6.0 | 13.4 | 235 | 40 | –8 | 6 |
| 30 | 2.22 | 122 | 182 | 1680 | 1670 | 3270 | 12.8 | 6.8 | 2.2 | 5.8 | 13.2 | 248 | 38 | –8 | 6 |

Furthermore we can mention the investigations on the application of the laterally drifted trawl net jointly carried out in 1987, too. This construction is based on the idea to be in a better position to catch fish achools frightened to the side near the surface of water (cf. Fig. 7). These tests were successful and encouraged to carry out large–scale trials confirming the experimental investigations and forming the basis for further developments of those trawl nets.

However, joint model tests have also been carried out aiming at a direct support of GDR fishery in practice. We examined a model of a fishing gear which was dedicated for future application in GDR coastal fishery, A lot of results of our collaboration have been presented in publications and at international conferences (International Symposium on Ship Technology of the WPU, ICES, IFEO) and have found recognition among the specialists. The results of collaboration have been involved in the elaboration of doctoral theses in the field of fishing technology. In this way the high level of this collaboration has been proved.

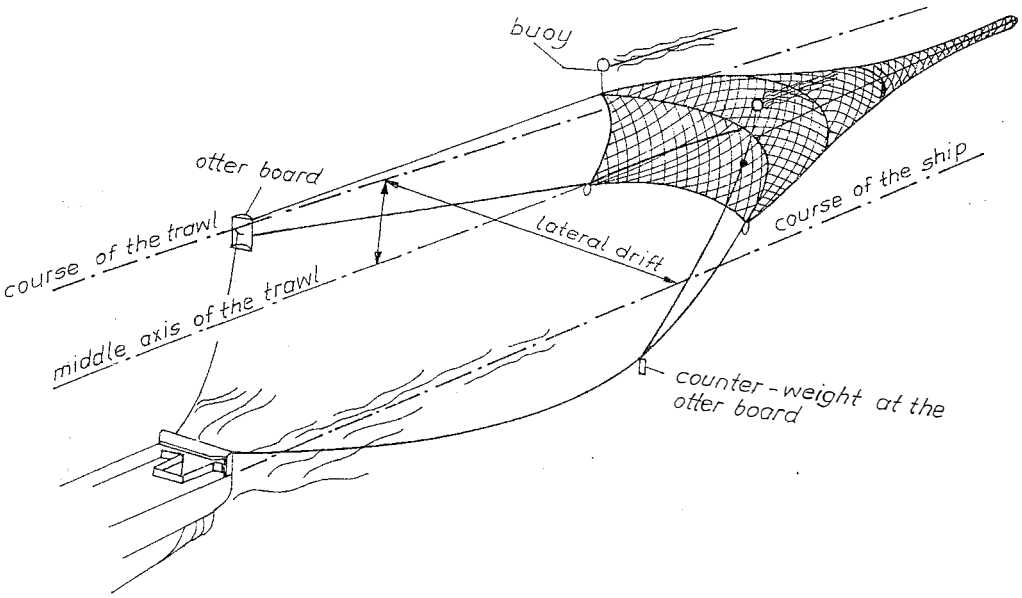



Fig. 7. Measurements of lateral drift of a trawl

## RESULTS OF THE COLLABORATION IN THE FIELD OF TEACHING

Apart from the collaboration in the field of research, a successful collaboration can be stated in the field of teaching, too. In 1984 Doz. Dr. Leitzke gave lectures about "Cable and net systems exposed to flow – as flexible towing systems" at the LASZ and in this year on "Maritime measuring techniques". In 1986 Prof. Dr. Świniarski stayed at the WPU to read lectures about "Netting materials – Theory and experimental investigations"

In 1987 Prof. Trzebiatowski stayed at the WPU to give lectures about "Standard and tendecies in the development of aquaculture". At present he is again reading lectures on this problem at the WPU.

It has also been in 1987, taht I myself gave lectures at the LASZ about "The introduction into the dynamics of trawl net systems" and in 1988 about "The mechanics of similitude and modelling of fishing gear". It proved to be useful to carry out guest lectures. The training had been extended and deepened, respectively, by choosing the items of lectures correspondingly to special results of investigations and experiences of the partners. In our opinion it would be useful to continue the exchange of guest lecturers dealing with

special problems between WPU and LASZ. It want to point out another positive experience. I mean the exchange of students to pass a partial study at the partner institution. In 1986 a student absolved his engineering practice at the LASZ. His subject was "Free-running tests applying fishing gear models". In 1987 another sudent stayed at the LASZ to complete his engineering practice. The problem he dealt with was "Preparation of tests for measuring form and forces of gillnets with inflow at various angles of attack". A third student absolved the engineering practice at the LASZ in 1988. Dealing with the problem "Rationalization in the evaluation of test results" he developed a programme system for the automated evaluation of tests carried out at the Ińsko open-water test station.

Those research works are a part of the collaboration in the field of the mechanics of fishing gear (subject No. 16) between the WPU and the LASZ. In 1989 two students of the LASZ stayed at the WPU to pass a partial study in the field of aquaculture. Delegating students for passing partial studies had proved to be very useful. Apart from gaining special knowledge at the partner institution, it is profitable for the development of the student's personality to get acquainted with the institution and with the collaborators as well as the neighbouring country. We are in favour of a continuation of these positive experiences.

Another measure of qualification related to teaching in the field of fishing at the WPU and the LASZ is the practical course in exchange in which nine students take part per annum. By mutually becoming acquainted with fishing in the partner country preconditions are created for a future cooperation and detailed information about living in the neighbouring country is given. I want to plead for a continuation of the exchange practice in the next five-year plan.

## FINAL REMARKS

Dear colleagues of the Institute of Aquaculture and Fishing Technology of LASZ. IN this papaer I outlined only some marked results of our fruitful collaboration. I think I can say that this collaboration has been and still is successful for both sides.

On the occasion of the 30th anniversary of the "Open-Water Test Station IŃSKO" today I want to thank you warmly for this good scientific-technological cooperation in the name of my colleagues of the Department of Fishing Technology of the WPU and in my own name. At the same time I want to express my hope, that we can continue this successful and let me say friendly cooperation in future. I wish the colleagues in the Institute a lot of success in their future teaching and research tasks as well as good health and good luck in their personal lives.

Harry *STENGEL*

## WYNIKI WSPÓŁPRACY NAUKOWO–BADAWCZEJ POMIĘDZY SEKCJĄ TECHNIKI RYBOŁÓWSTWA UNIWERSYTETU W ROSTOCKU I KATEDRĄ TECHNIKI RYBOŁÓWSTWA AKADEMII ROLNICZEJ W SZCZECINIE

STRESZCZENIE

W pracy omówiono kierunki i dotychczasowe wyniki współpracy naukowo–technicznej pomiędzy Sekcją Techniki Rybołówstwa Uniwersytetu w Rostocku i Katedrą Techniki Rybołówstwa AR w Szczecinie.

Podstawą współpracy jest umowa podpisana przez Rektorów wymienionych Uczelni. Współpraca dotyczy badań i szkolenia. Dotychczasowa współpraca w zakresie badań dotyczyła zarówno wspólnych badań teoretycznych jak i eksperymentalnych, głównie w dziedzinie mechaniki narzędzi połowu (włoków). Natomiast współpraca w zakresie szkolenia obejmuje wymianę praktyk studenckich, wykładowców i wspólne realizowanie prac dyplomowych.

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