

Резюмета на трудовете в печатен и електронен вариант

(Summaries of works in printed and electronic form)

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1. **Acomi, N.** (2020) 'Impact of Chart Data Accuracy on the Safety of Navigation', *Transnav - International Journal On Marine Navigation And Safety Of Sea Transportation*, 14(2), p. 411-415. doi: 10.12716/1001.14.02.19. WOS:000581153700018

<https://www-webofscience-com.am.e-nformation.ro/wos/woscc/full-record/WOS:000581153700018>

Abstract: Conducting navigation by using electronic charts is not an option anymore. With few exceptions, vessels shall carry on board electronic navigational charts and Electronic Chart Display and Information Systems. The official electronic charts are issued by or on behalf of the authority of a Government, authorized Hydrographic Office or other relevant government institutions. These nautical charts are compiled from multiple data sources, some modern and very comprehensive, while others older. The accuracy of data, named "Category Zones of Confidence – CATZOC", differs among various navigation areas. The navigation officers of the watch rely on the chart data to calculate the safety parameters and to plan the route in advance for the intended voyage. The aim of this paper is to emphasize the impact which the data accuracy has on the safety of navigation. For this purpose, a model vessel was considered in a Strait of Dover bridge simulation scenario, assuming good weather conditions without swell or current. The Safety Contour was defined using a mathematical formula which incorporated the under keel clearance, the squat effect and the tide levels. Then, the Safety Contour was examined considering the chart data accuracy. The results of this analysis contribute to increasing awareness and better understanding of CATZOC influences on the identification of safe waters during navigation.

2. Andrei, C., Stanca, C., **Acomi, N.**, Dumitrache, C., Ancuta, C. (2018) 'Damage stability analysis in particular flooding situations of a multipurpose cargo ship', *IOP Conference Series: Materials Science and Engineering*, 400, p. 082001. doi: 10.1088/1757-899x/400/8/082001. WOS:000461147400181

<https://www-webofscience-com.am.e-nformation.ro/wos/woscc/full-record/WOS:000461147400181>

Abstract. Flooding of ship compartments is a very common event resulted from ships involvement in marine accidents, such as collision, grounding or structural breakdown. Once ship compartments are flooded to an extended level, the transverse stability starts to be affected and if the situation become dangerous, it can become critical or failing beyond the lower threshold values. In this damaged situation, a proper and accurate calculation and assessment of stability is very important. Calculation of damage stability for flooding situations is a very important subject for those who work in design and operation of ships. However, the subject was treated extensively in respect of tanker ships and less in respect of multipurpose cargo ships. The aim of work presented in this paper is to highlight some particular situations of flooding of compartments on board a multipurpose cargo ship when the stability parameters are decreasing enough so that fails to comply with recommended criteria. The particularity of the study for this type of ships came from the fact that are fitted with large box type cargo holds which in case of flooding are generating large free surface effects with a high negative impact on ship's stability. Thus, four situations of flooding are presented and the analysis of stability parameters are illustrated in line with the actual regulations, in respect of damage stability, established by international conventions. Based on the results of calculations, the study gives recommendations regarding the actions to be taken in order to limit the dangerous consequences of such situations. The results of the particular flooding situations presented can be used to continue the improvement of design and operation for this type of ships.

3. Andrei, C., **Acomi, N.** & Ancuta, C. (2018) 'Roll motions analysis to improve ship responses in adverse weather conditions', in *ATOM-N Conference 2018: Advanced Topics in Optoelectronics*,

Microelectronics and Nanotechnologies, Constanta. Proceedings of SPIE Volume: 10977 Article Number: UNSP 109771Q DOI: 10.1117/12.2322704 Published: 2018 WOS:000458717900061

<https://www-webofscience-com.am.e-nformation.ro/wos/woscc/full-record/WOS:000458717900061>

Abstract: The analysis of the roll motions experienced by container ships in adverse weather conditions represents an important topic for researchers in maritime industry. High and dangerous roll motions occur at ships such as container carriers, which were constructed with large flares fore and aft. These roll motions generate accelerations in the lashing equipment. The accelerations exceeding the threshold values lead to the collapse of containers stows and even the loss of containers overboard. This paper aims at analysing the roll motions of a container ship in adverse weather conditions in the North Atlantic Ocean. For this purpose, simulations were carried out by using the OCTOPUS software. Real environmental conditions were simulated, in order to obtain a relevant response of the model ship. The results of the simulation include the identified causes and pertaining analyses of factors that generated the dangerous situation. Further to these, two simulations will be carried out to observe the response of the ship when altering course and speed. As such, studying these responses would lead to a better understanding of the root causes that generated the exposure of the ship to dangerous roll motions and may be used as recommendations for avoiding similar situations in the future.

4. Ancuta, C., Stanca, C., Andrei, C. **Acomi, N.** (2017) 'Behavior analysis of container ship in maritime accident in order to redefine the operating criteria', IOP Conference Series: Materials Science and Engineering, 227(1). WOS:000409221600004

<https://www-webofscience-com.am.e-nformation.ro/wos/woscc/full-record/WOS:000409221600004>

Abstract. In order to enhance the efficiency of maritime transport, container ships operators proceeded to increase the sizes of ships. The latest generation of ships in operation has 19,000 TEU capacity and the perspective is 21,000 TEU within the next years. The increasing of the sizes of container ships involves risks of maritime accidents occurrences. Nowadays, the general rules on operational security, tend to be adjusted as a result of the evaluation for each vessel. To create the premises for making an informed decision, the captain have to be aware of ships behavior in such situations. Not less important is to assure permanent review of the procedures for operation of ship, including the specific procedures in special areas, confined waters or separation schemes.

This paper aims at analysing the behavior of the vessel and the respond of the structure of a container ship in maritime accident, in order to redefine the operating criteria. The method selected by authors for carrying out the research is computer simulations. Computer program provides the responses of the container ship model in various situations. Therefore, the simulations allow acquisition of a large category of data, in the scope of improving the prevention of accidents or mitigation of effects as much as possible. Simulations and assessments of certain situations that the ship might experience will be carried out to redefine the operating criteria. The envisaged scenarios are: introducing of maneuver speed for specific areas with high risk of collision or grounding, introducing of flooding scenarios of some compartments in loading programs, conducting of complex simulations in various situations for each vessel type.

The main results of this work are documented proposals for operating criteria, intended to improve the safety in case of marine accidents, collisions and groundings. Introducing of such measures requires complex cost benefit analysis, that should not neglect the extreme economic impact that may result from such casualties.

5. **Acomi, N.** and Acomi, O. C. (2016) 'The effect of early berthing prospects on the energy efficiency operational index in oil tanker vessels', IOP Conference Series: Materials Science and Engineering, 145(8), p. 082001. doi: 10.1088/1757-899x/145/8/082001. WOS:000396437600131

<https://www-webofscience-com.am.e-nformation.ro/wos/woscc/full-record/WOS:000396437600131>

Abstract. Marine pollution is one of the main concerns of our society. In order to reduce air pollution produced by ships, the International Maritime Organization has developed technical, operational and management measures. Part of the operational measures refers to CO₂ emissions that contribute to the energy efficiency of the vessel. The difficulty in assessing the energy efficiency of the vessel rests with the diversity of voyage parameters, including quantity of cargo, distance and type of fuel in use. Assessing the energy efficiency of the vessel is thus not a matter of determining the absolute value of the CO₂, but of providing a meaningful construct to enable tracking performance trends over time, for the same ship, a fleet of ships or across the industry. This concept is the Energy Efficiency Operational Index, EEOI. The purpose of this study is to analyse the influence of a well predicted voyage on the EEOI value. The method

used consists in a comparative analysis of two situations regarding berthing prospects: the real passage plan and an early prediction that supposes the vessel to arrive on time as required. The results of the study represent a monitoring tool for the ship owners to assess the EEOI from the early stage of designing the berthing prospects.

6. 6 Acomi, O. and **Acomi, N.** (2016) 'Critique to Pro-Cyclical Admission in Maritime Higher', in. Cognitive-crcs. doi: 10.15405/epsbs.2016.09.3. WOS:000390912200003

<https://www-webofscience-com.am.e-nformation.ro/wos/woscc/full-record/WOS:000390912200003>

Abstract. The paper represents a critical analysis of the options ahead of maritime universities in terms of number of students admitted, particularly in periods of industry downturns. The study refers to the global maritime industry and analyses the patterns of the industry cycle. These patterns are characterised in macroeconomic terms by peaks, troughs and secular long term trends. The current maritime industry faces chronic global trade imbalances in the context of slow global economic. The secular trend has flattened and the industry is clearly in the downturn. These patterns envisage both cyclical and structural unemployment components. This paper addresses the maritime universities' options associated with cyclical unemployment of maritime graduates. These options include pro-cyclical, counter-cyclical or level capacity approaches in the students' admission capacity planning, depicted by the duration of studies and the offset between admission and graduation.

The analysis overlays the graduate studies and industry cycles and proposes to evaluate the different scenarios based on industry outlook and to determine the optimum admission policy solution.

7. **Acomi, N.** and Ovidiu, A. (2016) 'Diversification of Seafarers' Employability Paths', in. Cognitive-crcs. doi: 10.15405/epsbs.2016.09.4. WOS:000390912200004

<https://www-webofscience-com.am.e-nformation.ro/wos/woscc/full-record/WOS:000390912200004>

Abstract. Romania's admission following the extension of the EU and the globalisation of the maritime industry exposed Romanian employees to the maritime labour market. This market is characterised by increased competition determined by technological advancement and the emerging new Asian maritime nations. These conditions were exacerbated by the increased wage expectations of the European maritime manpower. On the demand side, the maritime industry has historically been characterised by lack of marine officers, in particular of senior rank, but the current slow global economic recovery and the weak commodity demand tend to level the scorecard. These changes affected the marine global labour market and led to structural unemployment among Romanian seafarers.

Considering the traditional purpose of marine universities – to prepare marine officers, and the labour market needs – marine officers highly qualified in specific fields, this paper aims at identifying the skills required by marine industry and analysing the possibility to extend them to other positions/qualifications from the marine industry.

8. Stanca, C. Ancuta, C., **Acomi, N.**, Andrei, C. (2016) 'Assessment of current criteria for dynamic stability of container vessels', IOP Conference Series: Materials Science and Engineering, 145(8), p. 082022. doi: 10.1088/1757-899x/145/8/082022. WOS:000396437600152

<https://www-webofscience-com.am.e-nformation.ro/wos/woscc/full-record/WOS:000396437600152>

Abstract. Container vessels sailing through heavy weather are exposed to a significant variation of stability due to specific shape of the hull combined with the action of the waves. Even if the weather forecast is transmitted to vessels, the way of acting it is a matter of officers' experience. The Maritime Safety Committee, under the International Maritime Organization, has approved the Guidance to the master for avoiding dangerous situations in adverse weather and sea conditions. Adverse weather conditions include wind induced waves or heavy swell. The development of dangerous phenomena such as surf-riding and broaching to, synchronous and parametric rollings is a result of a these adverse conditions which has to be encountered by the vessels. Understanding the dynamic stability of the vessel in the waves and ship's behaviour based on mathematical and physical rules is a difficult task, any effort in order to assess these components are salutary. To avoid excessive acceleration and forces which can damage the hull of the vessel, lashing and integrity of containers, course and speed may need to be changed for the vessel's motion in heavy seas. Specific software have been developed as aids for evaluating the response of the vessel in heavy seas according to parameters variations. The paper aims at assessing of current criteria for dynamic stability of a container vessel model ship in order to determine the ways for avoiding dangerous conditions. The results should be regarded as a supporting tool during the decision making process.

9. **Acomi, N.**, Ancuta, C., Andrei, C., Bostina, A., Bostina, A. (2016) 'Avoiding the parametric roll', in Vladescu, M., Tamas, R., and Cristea, I. (eds) Advanced Topics in Optoelectronics, Microelectronics, and Nanotechnologies VIII. SPIE. doi: 10.1117/12.2243360. WOS:000391359600094

<https://www-webofscience-com.am.e-nformation.ro/wos/woscc/full-record/WOS:000391359600094>

Abstract. Ships are mainly built to sail and transport cargo at sea. Environmental conditions and state of the sea are communicated to vessels through periodic weather forecasts. Despite officers being aware of the sea state, their sea time experience is a decisive factor when the vessel encounters severe environmental conditions. Another important factor is the loading condition of the vessel, which triggers different behaviour in similar marine environmental conditions. This paper aims to analyse the behaviour of a port container vessel in severe environmental conditions and to estimate the potential conditions of parametric roll resonance. Octopus software simulation is employed to simulate vessel motions under certain conditions of the sea, with possibility to analyse the behaviour of ships and the impact of high waves on ships due to specific wave encounter situations. The study should be regarded as a supporting tool during the decision making process.

10. **Acomi, N.**, Acomi, O. C. and Stanca, C. (2015) 'The use of ECDIS equipment to achieve an optimum value for energy efficiency operation index', IOP Conference Series: Materials Science and Engineering, 95(1). WOS:000365128900071

<https://www-webofscience-com.am.e-nformation.ro/wos/woscc/full-record/WOS:000365128900071>

Abstract. To reduce air pollution produced by ships, the International Maritime Organization has developed a set of technical, operational and management measures. The subject of our research addresses the operational measures for minimizing CO₂ air emissions and the way how the emission value could be influenced by external factors regardless of ship-owners' will. This study aims to analyse the air emissions for a loaded voyage leg performed by an oil tanker. The formula that allows us to calculate the predicted Energy Efficiency Operational Index involves the estimation of distance and fuel consumption, while the quantity of cargo is known. The electronic chart display and information system, ECDIS Simulation Software, will be used for adjusting the passage plan in real time, given the predicted severe environmental conditions. The distance will be determined using ECDIS, while the prediction of the fuel consumption will consider the sea trial and the vessel experience records. That way it will be possible to compare the estimated EEOI value in the case of great circle navigation in adverse weather condition with the estimated EEOI value for weather navigation.

11. Acomi, O., Bostina, A., Bostina, A., **Acomi, N.** (2015) 'Optimizing ships' behaviour when sailing in following seas', IOP Conference Series: Materials Science and Engineering, 95(1). doi: 10.1088/1757-899X/95/1/012069. WOS:000365128900069

<https://www-webofscience-com.am.e-nformation.ro/wos/woscc/full-record/WOS:000365128900069>

Abstract. Ships are built for sailing and transporting cargo on seas and oceans in weather conditions that are not friendly all the time. Even if the weather forecast is transmitted to vessels, the way of acting is a matter of officers' judgement, based on their knowledge and experience. The subject of this paper is to analyse the behaviour of a port container vessel in different weather conditions. The method consists in using a specially developed software which takes into account the main particulars, the actual stability and the dynamic characteristics of the individual ship in the real voyage conditions, in order to obtain the Dangerous Zone Diagram.

In order to avoid surf-riding and broaching the master should reduce speed to less than the critical speed. The results of the study are presented in a diagram that allow us to analyse the situation and to determine the ways for avoiding dangerous conditions by changing the course or the speed. The study should be regarded as a supporting tool during the decision making process.

12. Acomi, O., **Acomi, N.** and Stanca, C. (2015) 'The importance of correct passage planning and weather prediction in lowering the ship's carbon emissions', in Towards Green Marine Technology and Transport. Informa UK Limited, pp. 755-759. doi: 10.1201/b18855-99. WOS:000505749600087

<https://www-webofscience-com.am.e-nformation.ro/wos/woscc/full-record/WOS:000505749600087>

Abstract. The air pollution produced by ships represents a concern of the International Maritime Organization and, seeking its reduction, the members of Marine Environment Protection Committee

developed technical, operational and management related guidelines. The subject of this paper is the analysis of the operational measures, recommended to be applied on-board vessels to estimate the energy efficiency of the voyage. The operational measures refer to the concept of EEOI - Energy Efficiency Operational Index, which represents the relationship between the carbon air emissions and the vessel's cargo work. This study emphasizes the evolution of the EEOI while changing the ship's route due to the meteorological conditions, for a complete voyage performed by a chemical tanker. The instrument preferred is the comparative analysis, considering the voyage affected by meteorological conditions against the voyage performed in normal conditions, along the shortest route.

13. **Acomi, N.** & Acomi, O. (2014) 'Improving the Voyage Energy Efficiency by Using EEOI', 9th International Conference on Traffic and Transportation Studies (Ictts 2014), 138, pp. 531–536. doi: 10.1016/j.sbspro.2014.07.234. WOS:000345425500058

<https://www-webofscience-com.am.e-nformation.ro/wos/woscc/full-record/WOS:000345425500058>

Abstract. The environment protection is one of the main concerns of our society and this paper aims at presenting some of the international efforts in the maritime transport. Marine pollution consists of water pollution and also air pollution. Regardless of the delay in recognizing the latter type of pollution, it rapidly gains many organizations to argue on it. The first step was including a dedicated annex in the International Convention for the Prevention of Pollution from Ships, which seek to minimize the airborne emissions from ships. The efforts continued and the International Maritime Organization has developed a series of measures for monitoring the emissions. These are grouped in three main directions: technical, operational and management related. The subject of our study is the concept of Energy Efficiency Operational Index, developed to provide ship-owners and ship-operators with assistance in the process of establishing a mechanism to achieve the limitation or reduction of emissions from ships in operation. It serves as a monitoring tool and it represents the mass of CO₂ emitted per unit of transport work. The paper presents the way how the commercial software can be used for estimating the EEOI value before the voyage, in comparison with the true value calculated on board. The true value is calculated based on unpredictable factors that might appear during the voyage: varying the speed, days on anchor, or waiting for orders period. The authors included these in a software solution, which allows to emphasize the influence of the on board measures over voyage energy efficiency.

14. **Acomi, N.,** Acomi, O., Bostina, A., Bostina, A. (2014) 'Choosing the optimum method of treating the ballast water onboard ships', *Advanced Materials Research*, 837, pp. 727–732. doi: 10.4028/www.scientific.net/AMR.837.727. WOS:000337000500125

<https://www-webofscience-com.am.e-nformation.ro/wos/woscc/full-record/WOS:000337000500125>

Abstract: Ships use ballast water to provide stability and maneuverability during a voyage. The transport of aquatic organisms from one place to another by ship's ballast water has created substantial environmental impact on discharging areas. In order to avoid that, the International Maritime Organisation (IMO) recommends treating the ballast water by different methods. Choosing one of them is a matter of quality of the treated ballast and cost, which in fact is the main factor that influences the owner's decision in fitting out the ship.

The paper presents four methods of managing ballast water: treating by filtration and irradiation with ultraviolet light, treating by de-oxygenation method, treating with biocide and treating by heating. After a short technical description we have analysed them from the advantages and disadvantages point of view. We calculated the total cost of implementing each system onboard including the investment cost, the consumption cost and the operation-maintenance cost. Considering the quantities of ballast water transported during a year by a port-container vessel, extracted from the Ballast Water Record Book, we would evaluate the unit cost per cubic meter of ballast treated. Because of the specific of each voyage there are other variables that we should take into account: the type of the vessel, the maximum quantity of ballast water treated between two ports of call using different methods and the minimum length of the voyage. These items influence the owner's decision in different ways: for example even if the unit cost for treating ballast water by one method is the smallest, it is possible that the time for treating the entire amount of ballast water by that method could be longer than the length of the voyage, and that method cannot be accepted. In this case it could happen to have to discharge the ballast water before finishing the treating operation.

Taking into account the above mentioned situation the purpose of this study is to develop an instrument for selecting the optimum method of ballast water treatment suitable for each type of vessel or voyage, so

the ship-owners would be able to choose a treatment method comparing the costs, based on the specific requirements.

15. **Acomi, N.** and Acomi, O. (2013) 'Computer based program for fitting cargo area foam fixed fire-fighting equipment on chemical tankers', in Developments in Maritime Transportation and Exploitation of Sea Resources. Informa UK Limited, pp. 705–709. doi: 10.1201/b15813-87. WOS:000328325100010

<https://www-webofscience-com.am.e-nformation.ro/wos/woscc/full-record/WOS:000328325100010>

Abstract. Along the years, statistics show that fire is one of the main causes of maritime disasters, resulting in loss of life, ship's loss and pollution. The need for safety on chemical tankers has been widely acknowledged and the International Maritime Organization has taken steps in this direction by issuing the International Code for the Construction and Equipment of Ships Carrying Dangerous Chemicals in Bulk. Fitting the vessel with any type of fire extinguish system should comply with this Code. This paper aims to highlight the particularities of cargo area foam fixed fire-fighting equipment on board chemical tankers and to state on the importance of an optimum design. The purpose of the study is to create a computer based instrument which will calculate the components of such equipment based on the ship's characteristics. These findings would enable the owner to choose the most suitable system avoiding under or over-sizing it.

16. **Acomi, N.** and Acomi, O. (2014) 'The influence of different types of marine fuel over the energy efficiency operational index', Energy Procedia, 59, pp. 243–248. doi: 10.1016/j.egypro.2014.10.373. WOS:000375918200033

<https://www-webofscience-com.am.e-nformation.ro/wos/woscc/full-record/WOS:000375918200033>

Abstract. One of the main concerns of our society is certainly the environment protection. The international efforts for maintaining a clean environment are various and this paper refers to the efforts in the maritime transport field. The subject of our study is the concept of Energy Efficiency Operational Index (EEOI), developed to provide ship-owners with assistance in the process of establishing the emissions from ships in operation, and to suggest the methods for achieving their reduction. As a monitoring tool, EEOI represents the mass of CO₂ emitted per unit of transport work. Using the software developed by the authors, it will be emphasized the variation of the EEOI value for one vessel using different types of fuel during the laden and ballast voyages, for a period of three months, as stated in the Ship's Log Books. The main consumers considered are Main Engine, Diesel Generators and steam Boilers, and the types of fuel used will be as per charter party agreements and following the specific international and local rules and regulations. The results for the quality parameter EEOI and the average cost of achieving them will be included in compared cost-to-quality graphs, in order to underline the profitability of the studied methods for minimizing the air emissions.

17. **Acomi, N.** Popescu, C., Varsami, A., Chircor, M., Grosan, V. (2012) 'A new method for treating the ballast water by heating', 23rd DAAAM International Symposium on Intelligent Manufacturing and Automation 2012, 1, pp. 505–508. WOS:000392423800117

<https://www-webofscience-com.am.e-nformation.ro/wos/woscc/full-record/WOS:000392423800117>

Abstract. In this paper we intend to discuss the prevention of marine species' transfer from a different maritime area to another. The main instrument used in such situations is the International Convention for Control and Management of Ship's Ballast Water and Sediments – BWM, 2004, which introduces the quality standards that the ballast water has to comply with after it has been treated by using different methods. Further on, we are presenting a solution for treating the ballast water by heating it, after modifying the ballast installation onboard and using the abstracted thermal energy from the main engine. We have managed this by making two major modifications of the onboard cooling circuits: one is represented by the modification of the seawater system existing onboard and the second modification is represented by the usage of the abstracted thermal energy from the main engine by fixing a heat exchanger on the freshwater cooling system.

18. Bostina, A., Bostina, A., **Acomi, N.**, Doinea, G. (2012) 'Inspection procedure of tanks and void spaces', 23rd DAAAM International Symposium on Intelligent Manufacturing and Automation 2012, 2, pp. 861–864. WOS:000392423800199

<https://www-webofscience-com.am.e-nformation.ro/wos/woscc/full-record/WOS:000392423800199>

Abstract. This paper aims to present details of the processes and techniques associated with performing an onboard inspection and enhance structural knowledge so that the maintenance and repair activities are better structured and informed. Guidance is given on structural inspections and the common defects encountered. All defects that affect the structural efficiency or the safety of the ship are to be reported to classification society at the earliest opportunity. To identify where a defect is likely to occur you will need to take into account all of the factors. The structural areas to be inspected shall include cargo spaces, ballast tanks, the main deck, fore and aft end structure, engine room and machinery spaces, and the accommodation areas. Each of these areas may have particular defects that occur only in that area.

19. **Acomi, N.** and Ghita, S. (2012) 'Using heat treatment of ballast water for killing marine microorganisms', 23rd DAAAM International Symposium on Intelligent Manufacturing and Automation 2012, 2, pp. 1115–1118. WOS:000392423800259

<https://www-webofscience-com.am.e-nformation.ro/wos/woscc/full-record/WOS:000392423800259>

Abstract: By ships ballast water are transferred and discharged non-indigenous aquatic organisms into receiving waters. The Black Sea also was involved in such events as a source of organisms and as a colonized space too. To avoid that, the International Maritime Organization recommends treating the ballast water by means of different methods. One of them is based on heating ballast water in order to kill the organisms and microorganisms. The paper present a system for recovering the heat from main engine for rise the temperature of ballast water and the impact of different stages of heating on the total number of cells. The samples were collected from Black Sea, analyzed using epifluorescent microscope and to estimate the total number of cells the CellC software was used.