

CFD coupled with commercial

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Abstract—Zelin is a start-up based in Toulouse, specializing in numerical simulation and artificial intelligence, which has employed around ten people since its creation in 2018. Both a design office, a web solutions developer and a consulting company, Zelin works for clients in the aeronautics, space, transport and energy sectors.

The purpose of Zelin company is to promote industrial innovation by supporting manufacturers thanks to its expertise in numerical simulation in the fields of fluid and structural mechanics, thermal and electromagnetism, as well as in artificial intelligence thanks to its skills in Machine Learning and Data Science in particular. To achieve this, Zelin offers optimized numerical studies which enable manufacturers to design ever more innovative and high performance products thanks to numerical simulation and AI. In addition, its web platform, which is fully accessible online, includes access to a community of experts (design offices, freelancers, specialists, researchers), to software resources and powerful machines and to innovative tools that enable the simulations carried out to be visualised in three and four dimensions, shared and optimised.

It is in this context that Zelin has interns among its team who participate in its technical and commercial development.

Index Terms—Computational Fluid Dynamics (CFD), Artificial Intelligence (AI)

I. INTRODUCTION

My role as a technical and commercial CFD engineer for 6 months was both to carry out technical studies and to participate in the commercial development of the company.

On the one hand, the technical aspect of this internship consisted of carrying out CFD studies on simple industrial cases of aerodynamic or hydraulic flows. On the other hand, the commercial part consisted in participating in the prospection of new customers, in the recruitment of new talents and in the communication of the company.

It was therefore a question of taking a full part in the growth of this company.

II. CFD ENGINEERING

A. Wind study on buildings

The first project I worked on was a wind study on the Toulouse buildings. The objective was to numerically simulate the airflow around the buildings in order to analyse the priority wind circulation areas in the city. The first step was to get a topography of the Toulouse city with its buildings and to

extract a numerical model compatible with our simulation software. Then, after having determined all the problem data, the fluid mechanics equations were solved to visualise the flow for several wind forces and directions for restricted areas at first (near Capitole), and then, progressively for larger areas until reaching the whole surface of the pink city.

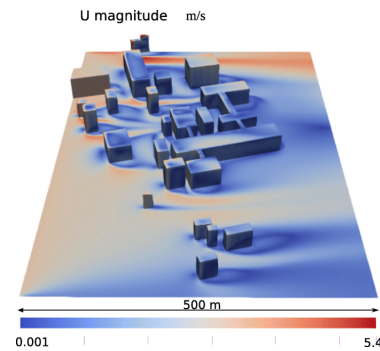


Fig. 1. Wind velocity between some Toulouse's buildings

B. Hydrofoil optimization

The other technical project entrusted to me was to carry out simulations for the optimization of a hydrofoil in order to allow the windsurfing world champion to beat the world record ([1], Zelin LinkedIn post, 2021). In collaboration with several team members and engineers external to the company, a complete parametric study was conducted. The aerodynamic and hydraulic flows as well as the stability of the foil were analyzed and optimized using AI.



Fig. 2. 3D visualization of the current lines (in air and water)

III. BUSINESS ENGINEERING

A. *Business*

The role of business engineer is closely linked to the role of real businessman. In this context, following a quick training on business, I was able to prospect new customers by presenting our activities during industrial shows or meetings. All this work has led to the identification of industrial needs in the field of photovoltaic or methanization for example.

B. *Recruitment and communication*

Other tasks I performed were for example to recruit new engineers and interns to come and strengthen the Zelin team as well as to prepare weekly linkedin posts on our activities. A lot of research, communication and interviews were required to successfully complete these missions. By the end of my internship, the company had hired two new engineers and two interns and gained over 2000 subscribers on its LinkedIn page.

IV. FEEDBACK

My tutor, who is also the Chief Executive Officer of the company, and the Chief Technical Officer gave me their confidence in many projects during this internship. Their feedback was generally positive throughout the internship as well as in the end of internship evaluation sheet because I was able to quickly integrate into the team, bring my vision to the problems encountered and generally meet the expectations of the internship.

Indeed, I think I have accomplished the missions of a technical and commercial CFD engineer with efficiency even though it was sometimes difficult for me to keep up with the company's rapid growth. That's why I think I have shown abnegation and organization.

V. CONCLUSION

This 6-month internship made me aware of the multidisciplinary nature of product manufacturing and industrialisation.

Zelin being a start-up, I was able to touch several aspects of the technical and business engineering professions. Through the various projects of the company, I had the opportunity to apply my CFD skills acquired at ENSEEIHT in an industrial context, while fully participating in the growth of the company, thanks to the recruitment, business meetings and linkedin posts I performed.

ACKNOWLEDGEMENT

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REFERENCES

- [1] LinkedIn post, "Battre le record absolu de vitesse à la voile : objectif > 121 km/h !", ZELIN, November 2021.