**A**

**TECHNICAL REPORT**

**ON**

**STUDENT INDUSTRIAL WORK EXPERIENCE SCHEME (SIWES)**

**UNDERTAKEN AT**

**CENTER FOR INDUSTRIAL STUDIES (CIS) FUTO**

**OWERRI, IMO STATE.**

**BY**

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**SUBMITTED TO THE DEPARTMENT OF MATERIALS AND METALLURGICAL ENGINEERING**

**SCHOOL OF ENGINEERING AND ENGINEERING TECHNOLOGY,FEDERAL UNIVERSITY OF TECHNOLOGY OWERRI (FUTO),**

**IN PARTIAL FULFILLMENT OF THE REQUIRMENTS FOR THE AWARD OF BACHELOR OF ENGINEERING IN MATERIALS AND METALLURGICAL ENGINEERING.**

**SUPERVISOR :ENGR. EGOLE**

**JULY 2021.**

**DEDICATION**

This report is dedicated to my beloved parents Mr&Mrs vitalis ike, for their categorical love and support in my life.

**Acknowledgement**

I wish to register my profound gratitude to God almighty for his guidance and grace throughout my life.

Also it is obligatory for me to thank Engr. Prof. G. I. Nwandikom the CIS director futo, Mr. L. O. Effiong, the chief technologist of CIS futo, owerri, most especially Engr. Donatus the foundry technician CIS futo, who really made my stay there enjoyable and worthwhile, as he welcome all sort of questions thrown to him.

Can't end this piece without letting my gratitude to my colleagues who in their own different ways made the learning process so fascinating and enticing.

Lastly, using this media to thank my lovely parents who supported me financially and in other aspect, God bless you, and to other technicians whom there names may have not been mentioned, I really appreciate for your efforts God bless you all.

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**ABSTRACT**

The student industrial work experience scheme established by the federal government of Nigeria was aimed at exposing student of higher institution to acquire industrial skill and practical experience in their approved courses of study and also to prepare the students for the industrial work situation which they are likely to meet after graduation. This technical report is based on the experience gained during my one month of industrial training at center for industrial studies (CIS) futo, owerri,imo state. This report shows the true knowledge of foundary and melting operation carried out in the foundary labouratory ,and contains a meticulous requirement for a good upgrade of a metallurgist.

**CHAPTER ONE**

**INTRODUCTION**

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## 1.0 OVERVIEW OF SIWES

The Students Industrial Work Experience Scheme (SIWES) is a Skills Training Programme designed to expose and prepare Students of Universities, Polytechnics, Colleges of Technology, Colleges of Agriculture and Colleges of Education for the Industrial Work situation they are likely to meet after graduation. The Scheme also affords Students the opportunity of familiarizing and exposing themselves to the needed experiences in handling equipment and machinery that are usually not available in their Institutions.

Before the establishment of the Scheme, there was a growing concern among our industrialists that graduates of our Institutions of higher learning lacked adequate practical background studies preparatory for employment in Industries. Thus, Employers were of the opinion that the theoretical education in Higher Institutions was not responsive to the needs of the Employers’ of Labour. It is against this background that the Industrial Training Fund (ITF) initiated, designed and introduced SIWES Scheme in 1973 to acquaint Students with the skills of handling Employers’ equipment and machinery.

The Industrial Training Fund (ITF) solely funded the Scheme during the formative years. However, due to financial constraints, the Fund withdrew from the Scheme in 1978. The Federal Government, noting the significance of the skills training, handed the management of the Scheme to both the National Universities Commission (NUC) and the National Board for Technical Education (NBTE) in 1979. The management and implementation of the Federal Government in November, 1984 and the administration was effectively taken over, by the Industrial Training Fund in July 1985, with the funding solely borne by the Federal Government.

During my Industrial Training which was undertaken between November 2019-December 2019, most of these SIWES objectives were achieved.

## 1.1 HISTORY OF SIWES

The vision of Industrial Training Fund, when it initiated the Students Industrial Work Experience Scheme (SIWES) in 1973, was the provision of an avenue for students to acquire practical industrial exposure in their respective disciplines during their course of studies. Such exposure, it was envisaged, would prepare students to fit, more readily, into an industrial work environment after their academic career. The scheme was also designed to offer lectures the opportunity to evaluate the relevance of training to the needs of industry.

The scheme commenced in 1974 with eleven (11) institutions. By 1978, when the number of institutions had grown from eleven to thirty-two (32), the ITF was forced to reduce the number of approved programs to Engineering and Technology disciplines in universities, polytechnics and colleges of technology. In 1979, the Federal Ministry of Education made it compulsory for all students of polytechnics and colleges of technology to undergo one-year Industrial Attachment. This new arrangement created a financial burden which was too high to be shouldered by the ITF. In addition, the fund did not have the capacity to monitor and supervise all students on Industrial Attachment hence, its decision to withdraw its support for polytechnics and colleges of technology.

Furthermore, despite limiting the program to universities, the financial implication in respect of the number of students was still too high for the ITF to shoulder. Consequently, all participating universities were duly notified that the ITF would be withdrawing from financing the scheme as from January, 1980.

As a result of ITFs withdrawal, Federal Government took over the funding of the scheme through the National Universities Commission (NUC) and the National Board for Technical Education (NBTE). These two commissions managed the scheme for five (5) years (1979-1984).

When the NBTE assumed administration of the scheme for students of polytechnics and colleges of technology under the one-tier system of Technical Education, the nomenclature was changed to “Compulsory Supervised Industrial Training Attachment” (COSITA). During this period, the scheme was expanded to include fifty (50) disciplines, many of which were non technical. As a result of this, the operation of the scheme became more complex and cumbersome. Consequently, the Federal Government handed over the administration of the scheme to the ITF in December, 1984.

In 1974, when the scheme started, a total of 784 students participated, while in 1978, 4713 students participated. Between 1979 and 1984 when the scheme was handled by NUC and NBTE, reliable figures on student’s participation were not compiled due to operational problems. When the ITF took over the scheme again in 1985, a total of 16,912 students participated. As the number of institutions kept on increasing, the number of students participating in the scheme also continued to rise. For example, between 1985 and 1995, the number of institutions rose to 141 with a total of 57,433 students. Similarly, as institutions of higher learning continued to introduce new courses, the level of student’s enrolment continued to increase alongside persistent demand for participation in the scheme.

One of the strategies designed to facilitate smooth operations of the scheme is the payment of supervisory allowances to higher institutions and monthly allowances to the benefiting students. Between 1974 and 1978, ITF financed the scheme, while from 1979 to 1998 the Federal Government took over the financing through the NUC and NBTE. During this period, the initial allowance made to students was N30.00 per student per month. This was increased to N50.00 and then N90.00 in 1976. As from 1981 there was a relative increase in both supervisory and students allowances to N25.00 per student per month and N250.00 per student per month respectively. This allowance regime prevailed until it was reviewed to the present rate of N2,500 per student per month. The students Industrial Work Experience Scheme serves as an accepted skills training program. The program is part of the Minimum Academic Standards in the various degree programs within Nigerian Universities. The SIWES program helps to harmonize the extensive theoretical background of the industry. By this scheme, students are exposed to equipment and infrastructure, which are not affordable by, or unavailable in the tertiary institutions.

During the industrial training, students are exposed to machines equipment, professional methods to work, industrial safety of the work equipment as well as the workers in the industries and other relevant workplaces such as research institutions, etc. Industrial work is not necessarily limited to indoor work. Field work could also be involved during the training. In this case, the student is expected to make the best use of the training period to adapt to work in all the relevant domains. The generally approved duration for student’s industrial work experience scheme is twenty-four (24) weeks. This means that a student needs to be on the program for six (6) months in order to get the best value from the training.

## 1.2 OBJECTIVES OF SIWES

1. To provide an avenue for students in Nigerian universities to acquire industrial skills and experience in their course of study.
2. To prepare students for the work situation they are likely to meet after graduation.
3. To expose students to work methods and techniques in handling equipment and machinery that may not be available in the universities and other institutions of higher learning.
4. To produce students with an opportunity to apply their theoretical knowledge in real work situations, thereby bridging the gap between university work and actual practice.
5. To make the transition from university to the place of work easier, and thus, enhance students contacts for later job placement.
6. To enlist and strengthen employer’s involvement in the entire education process of preparing university and other tertiary graduates for employment in industry.

**CHAPTER TWO**

**CENTER FOR INDUSTRIAL STUDIES**

## 1.0 INTRODUCTION

The establishment of the university of technology in Nigeria was a deliberate effort by the federal government to satisfy the widespread yearnings of Nigerians to turn out University graduates that possess in-depth practical bent necessary for self-employment on graduation. The aim of this practice is to equip graduates of Universities of Technology with sufficient and relevant practical skills needed for self-development. It is for the above reasons that the Centre for Industrial Studies was established in FUTO to help produce students as “finished products” having the ability to be self-reliant.

This Centre is the central hub for all students and staff for skill training which range from basic workshop practices to more advanced students/staff projects, postgraduate research and final year students’ projects. In accordance with its establishing mandate, the CIS also renders and provides consultancies to individuals, and corporate bodies, small and medium enterprises outside FUTO.

## 1.2 HISTORY OF C.I.S

Centre for Industrial Studies was created in the year 1986, under the leadership of Prof. V. O. Nwoko. He was the first to run the affairs of the center followed by the under-listed past directors.

**Records of Past Directors and the Years Served**

Prof. V. O. Nwoko – 1986 – 1987

Engr. Dr. O. Ekpe Okoroafor – 1987 -1992

Dr. C. C. Ndubuizu – 1992 -1996

Engr. Dr. S. E. Ogbogu – 1996- 1997

Prof. V. O. Nwoko (Second Appmt.) – 1997 -2000

Engr. Prof. O. O. Onyemobi – 2000 -2002

Engr. Prof. A. E. Iheonye – 2002 – 2006

Engr. Prof. P. B. U. Achi – 2006 – 2009

Engr. Dr. N. A. A. Okereke – 2009 – 2011

Engr. Prof. O. Ekpe Okoroafor – 2011- 2014

Engr. Prof. S. A. Asoegwu – 2015 – 2019

Engr. Prof. G. I. Nwandikom – 2019 till date

**Vision Statement**

Creating, nurturing and enabling our students and staff and engineering-based companies unlock their practical skills potentials needed to actualize their dream projects practically through training and service.

**Mission Statement**

To enhance technological growth, entrepreneurship and creation of wealth through programmed practical training and producing goods and services.

**Responsibility of the Center**

Making the Center the industrial hub in the University for Creating Wealth through the production of goods and services and inculcating in our students the practical based skills that will make them exceptional as “ready-made” products for the employment market.

***Sections and their Heads***

Umah A. Kalu

***Head of Electrical Section***

Okele Donatus C.

***Head of Foundry Section***

Martin O. Anyanwu

***Head of Machine Section***

John N. Emeana

***Head of Metal Fittings Section***

Abiakam Raymond

***Head of Welding and Fabrication Section***

Onyemetu Christopher

***Head of Woodwork Section***

Eke Emmanuel

***Head of Store Section***

## 1.3 SAFETY PRECAUTIONS

1. Always put on your safety gown so as much as to prevent stain or dirt on your wears
2. Conscious of the apparatus been handled
3. Prevent coming in contact with machines while in use ie. Always stay some distance apart while carrying out your practicals
4. No extra curriculum activities is been held in the workshop
5. The workshop should be properly arrange and kept in order before and after carrying out the daily activities.

# CHAPTER THREE

# PRODUCTION OF CLAMP

## 1.0 INTRODUCTION TO FOUNDARY

A foundry is a factory that produces metal castings. Metals are cast into shapes by melting them into a mold, and removing the mold material after the metal has solidified as it cools. The most common metals processed are aluminum and cast iron, however, other metals such as bronze, brass, steel, magnesium and zinc are also used to produce casting in foundries, in this process parts of desired shapes and sizes can be formed. Foundries are one of the largest contributors to the manufacturing recycling movement, melting and recasting millions of tone of scrap metal every year to create new durable goods. Moreover ,many foundries use sand in their molding process . these foundries often use recondition and reuse sand which is another form of recycling. In metalworking , casting involves pouring liquids metal into a mold, which contains a hollow cavity of the desired shape, a and then allowing it to cool and solidfy the solidified part is also known as a casting , which is ejected or broken out of the mold it complete the process, casting is the most often n used for making complex shapes that would be difficulty or uneconomical to make by other methods. Melting is performed in a furnace. Virgin material, external scrap, internal scrap, and alloying elements are used to charge the furnace. Virgin material refers to commercially pure forms of the primary metal used to form a particular alloy. Alloying elements are either pure forms of an alloying element, like electrolytic nickel, or alloys of limited composition, such as ferroalloys or master alloys. External scrap is material from other forming processes such as punching, forging, or machining. Internal scrap consists of gates, risers, defective castings, and other extraneous metal oddments produced within the facility.

The process includes melting the charge, refining the melt, adjusting the melt chemistry and tapping into a transport vessel. Refining is done to remove harmful gases and elements from the molten metal to avoid casting defects. Material is added during the melting process to bring the final chemistry within a specific range specified by industry and/or internal standards. Certain fluxes may be used to separate the metal from slag and/or dross and degassers are used to remove dissolved gas from metals that readily dissolve in gasses. During the tap, final chemistry adjustments are made.