Computer Aided Design of Flywheel Using 'C' Program

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Abstract: Flywheel, a machineelement is used to store rotational energy. Itwill have a specificmoment of inertia and resists changes in speed. The amount of energy stored in it, is proportional to the square of its rotational speed. Energy is stored in a flywheel by applying torque to it, thereby increasing its rotational speed. Then it releases stored energy by applying torque to a mechanical load, thereby decreasing its rotational speed.

Key words: Flywheel · C Programming

INTRODUCTION

Flywheel is a rotating machine element that is used to store rotational energy. Flywheels have a specific moment of inertia and thus resist changes in rotational speed. The amount of energy stored in a flywheel is proportional to the square of its rotational speed. Energy is transferred to a flywheel by applying torque to it, thereby increasing its rotational speed and hence its stored energy. Conversely, a flywheel releases stored energy by applying torque to a mechanical load, thereby decreasing its rotational speed [1].

Function of Flywheel: They provide continuous energy when the energy source is discontinuous.

They deliver energybeyond the ability of a continuously supplied energy from source. This happens by collecting energy in the flywheel over a period of time and then released whenever requiredquickly [2].

They control the orientation of a mechanical system. In such applications, the angular momentum of a flywheel is purposely transferred to a load when energy is transferred to orfrom the flywheel

Introduction of 'C': C is a structured, procedural programming language that is being used for operating systems and applications. Many versions of based on operating systems are written in C. C has been standardized as part of the Portable Operating System

FIG.21.1   FIG.21.2 STRAINS IN A FLYWHEEL
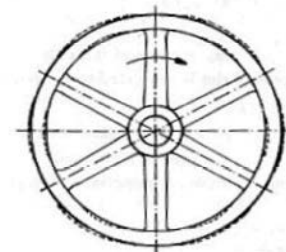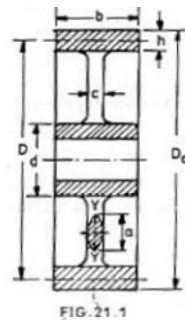
Interface. Withthe increasing popularity of object-oriented programming, C is being rapidly replaced as the programming language by C++, a superset of the C language that uses an entirely different set of programming concepts and by Java, a language similar to but simpler than C++.

Programming Language: The function available as a part of the language work as building block to develop more function. C language offers all essentials of structured programming in term of writing program such as logically-defined functions, functions returning values and functions keeping private variable. C language, offers only handful of functions, which form the core of the language; rest of the functions available in libraries are developed using the core functions offer by the language.thus the highly independent function can be written and stored in a library containing other functions to be used as and when necessary.

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These three are known as library function which is use as a backup for any program.
#include<stdio.h>
#include<conio.h>
#include<math.h>

Any program start with library functions which define the type of operation, like mathematical operation the types of data structures provided by c can be classified as Fundamental data types, Derived data types Fundamental data types include the data types at the lowest level, i.e. those which are used for actual data representation in the memory. All other data types are based on the fundamental data types.

The fundamental data types:
char: stand for characters and strings
int: for integers
float: for numbers with decimals such as amounts, quotients and salary
main( ) is a collective name given to a set of statements. All statements that belong to main( ) are enclosed within a pair of braces { } as shown below.

```
main( )
{
statement 1;
statement 2;
statement 3;
}
```

Technically speaking,main( ) is a function. Every function has a pair of parentheses ( ) associated with it.

Any variable used in the program must be declared before using it.

For example,
int p, n;
float s m,z,r;
Any C statement always ends with a;
For example,
floats,m,z, r;
In the statement,
s=(p*60)/(2*3.14*n);
r=(m*1000*v)/(n*s*1000);

'*'and '/' are the arithmetic operators. The arithmetic operators available in C are +, -, * and /. C is very rich in operators. There are about 45 operators available in C.

When the value of s is calculated it needs to be displayed on the screen. Output to screen is achieved using readymade library function printf( ). The general form of printf( ) function is,
printf ("<format string>", <list of variables>);
Following are some examples of usage of printf( ) function:
printf("Enter the Power to be transmitted \n");
printf("\nEnter the Newton value \n");
printf("\n\n Nominal Torque transmitted is %f nm \n",s);
What is '\n' doing in this statement? It is called newline. Therefore, you get the output split over two lines. '\n' is one of the several Escape Sequences available in C.
printf( ) can not only print values of variables and also print the result of an expression. An expression is nothing but a valid combination of constants, variables and operators.
getch();give the information to the computer programming has completed.

Program:
```
#include<stdio.h>
#include<conio.h>
#include<math.h>
int p, n;
float s, m, z,r;
int main()
{ voidtorquecal();
voidmaxtorq();
void diameter();
voidbendstress();
void elliptical();
printf("Enter the Power to be transmitted \n");
scanf("%d", and p);
printf("\nEnter the Newton value \n");
scanf("%d", and n);
torquecal();
maxtorq();
diameter();
bendstress();
elliptical();
getch();
}
voidtorquecal()
{ s=(p*60)/(2*3.14*n);
printf("\n\n Nominal Torque transmitted is %f nm \n",s);
}
voidmaxtorq()
{ m=2*s;
```

```
printf(" \n\n Maximum Torque is %f Nm \n", m);
}
void diameter()
{ float t=(16*m*1000)/(3.14*40);
z=pow(t,(1/3.0));
z=2*z;
printf("\n\n Diameter of the hub is %f mm \n", z);
}
voidbendstress()
{ int D= 1000, n=4, s=15;
float v =D-z;
r=(m*1000*v)/(n*s*1000);
printf("\n\n Bending stress in the arm, section modulus is
%f mm3 \n",r);
}
void elliptical()
{
float s;
s=(64*r)/3.14;
s=pow(s,(1/3.0));
s=s/2;
printf("\n\n Minor axis c = %f mm \n",s);
}
```

CONCLUSION

The flywheel was studied and we got the analytical solution of the flywheel. Thereafter we studied about the 'C' and we got the 'c' program solution. Hereafter we compared both the results and results are found to be same.

REFERENCES

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2. Balaguru Swami, 2009. Object oriented programming C; 3rd edition.