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CONTENTS

QUALITY ASSURANCE CONCEPTS OF INSTITUTIONALIZATION: SOME INDICATORS TOWARDS HIGHER EDUCATIONAL DEVELOPMENT POLICY IN LIBYA

Dr Milad EL Harathi

Department of Political Science, General Director, Researching,

Consultative and Training Centre, Benghazi University, Libya

ABSTRACT

The aim of this paper is to lay down some indicators for establishing new Libyan national development policy in the higher education sector, after the political changes in Libya in 17-2-2011 uprising and demolishing the old mechanism of controlling the higher education system in Libya. Its attempt shall be based on rediscover ways of achieving quality and sustaining it in the Libyan higher education system. This therefore, is the task of this paper. It will examine the concept of quality assurance and apply it to a Libyan University Institute.

THE UNIVERSITY MISSION

The strategic position of the university in any national development policy is beyond doubt. The original mission of any given university is primarily to promote knowledge through research and teaching. It is also to explore solutions to the country's problems and assist the larger society to achieve its objectives in the areas of human social and economic development as following:

(a) Contribute to national development through high-level relevant manpower training.

(b) Develop and inculcate proper values for the survival of the individual and society.

(c) Develop the intellectual capability of individuals to understand their local and external Environments.

(d) Acquire both physical and intellectual skills, which will enable individuals to be self reliant and Useful members of the society.

(e) Promote and encourage scholarship and community service.

(f) Promote national and international interaction

THE UNIVERSITY OBJECTIVES:

These goals will pursue through teaching, research, virile staff development programmes, generation and dissemination of knowledge. The policy expects the Libyan universities specifically to make optimum contribution to national development by intensifying and diversifying their programs for the development of high level manpower within the context of the needs of the new Libyan society`. The professional course contents of university education should also reflect national requirements and Libya's society needs of knowledge. The policy Also provides that university research will be relevant to new Libya's development goals and needs.

It is evident from these policy expectations that the university institution should be the basic think tank of the Libyan society in all areas. It should continuously generate ideals and knowledge and disseminate them, develop skills and abilities in all who seek knowledge within its walls. The university institution in new Libya should be the vanguard of societal responses to emergent political, economic, social and environmental problems. The advancement of humankind through the ages has been knowledge driven and knowledge is the basic product of universities.

For the Libyan education higher institutions to fulfill its mission, in general, it must devise ways of reversing the downward spiral in the quality of knowledge at produces and the services its delivers to its stakeholders and society. It must rediscover ways of achieving quality and sustaining it. This therefore, is the task of this paper. It will examine the concept of quality assurance and apply it to the Libyan education higher institutions production function in general.

For instance, why should the education institution in Libya assures of its products and services, its inputs and its outputs? What strategies can Libyan education higher institutions adopt with regard to these elements to assure quality? These questions shall be addressed in this paper through an educational quality Assurance thoughts and indicators, and how it can institutionalized in Libya?

QUALITY ASSURANCE CONCEPT

Quality assurance is a holistic term, which directed toward education as an entity. It entails the supplier and consumer and the various activities put in place to produce quality products and services. To further examine this concept meaningfully, three approaches to the definition of quality will be used. These are "the reputational approach, the outcomes approach and the total quality approach".

- **The Reputational Approach:**

This approach sees quality as exceptional, it is seen as exclusive. It is something that "some have at the exclusion of others". It is distinctive and intuitively recognizable. This approach regards quality as excellence, it is a standard attained in our context by exceptional universities and or their products.

- **The Outcomes Approach:**

This regards quality as efficient production. Here, there are no absolute standards but specifications. The quality of a product is measured by the extent to which it meets customer's specifications. This approach is more related to practices in industry.

- **Total Quality Approach**

Here quality is seen as value added. How much value has been added to the abilities of students for instance, who have passed through the system regardless of their ability levels? These are different views of quality when put together. However, we can accept that quality with regard to the output of university education is 'the level of excellence in performance on the strength of the quality of the context, inputs, process transaction and output"... This shows that to attain or assure quality in output a lot quality inputs and processes would have made. Quality in output does not come by chance. It requires carefully planned and deliberate efforts.

Meaning of Quality Assurance

The general meaning of quality assurance is very applicable to the production function of universities. It is the management of goods, services and activities from the input stage, through processes, to the output stage of production, Quality assurance aims at preventing quality problems and ensuring that only conforming products reach the customer. The characteristics of

an effective quality assurance mechanism are an effective quality management system Periodic audit of the operation of the system, Periodic review of the system to ensure it meets changing requirements.

It is clear therefore that an assurance process recognizes the need for a university to accept responsibility for its own management processes. This is the difference between quality assurance and inspection or evaluation. Quality assurance is a total, holistic process concerned with ensuring the integrity of outcomes. This places the responsibility for quality with the factory (university) itself, and thus expressed through its relationship with its customers.

Quality assurance recognizes the autonomy of organizations and seeks to enhance their capacity to operate in a responsive way. We can see here that individual universities have a responsibility of assuring the quality of their product and that is why our focus here is on quality assurance mechanism of the Libyan University Institution, in general.

Quality in Higher Education Meaning:

According to the author, it is possible to identify at least five definitions (Harvey and Green, 1993). First, is to see it as "producing perfection through continuous improvement by adopting Total Quality Management (TQM) to create a philosophy about work, people and human relationship built around shared values". This is a definition that points to the ideal, against which all other achievements are measured.

The second and less formidable definition is to see quality as" performance that is exceptional, attainable only limited circumstances and only when very able students are admitted ".

The third is to see it as the "ability to transform students on an on-going basis and add value to their knowledge and personal development".

The fourth definition is to see it as" the ability to provide value for money and to be publicly accountable ".

The fifth definition sees "quality as something which fits the purpose of the product or service, once the purpose has been decided" (Bogue and Saunders, 1992

Quality Assurance Requirements

The experiences of the most developed countries suggest that the adoption of an instrumental approach to quality assurance in higher education can only work if a number of conditions are met.

The first condition is that academic staff members are qualified. Research and teaching up to an acceptable level and the valuable nexus between them can only be produced two three when basic knowledge of the subject and the methodologies for research and teaching is present. Without this, research will be poorly formulated and executed, teaching lacking in breadth, depth and effectiveness, and the introduction of quality assurance not do much to increase standards to the desired level.

The second condition is that academics need only to be employed in one full-time job in one institution to live comfortably with their families. They can earn extra income by doing short-term consultancy work for industry, government or international organizations as part of their direct community service function.

The third condition is the presence of adequate physical, electronic and administrative support services, such as well equal.

Indicators of Quality in Higher Education:

There are indicators that are associated with quality education: These indicators are crucial to quality. They include:

- **The students:**

In industry, product quality to a certain extent depends on the quality of raw materials input. Quality leather, all other variables being favorable would invariably lead to quality shoes. Quality grapes to quality drink. In university education, the quality of student input is crucial to their eventual outcome what knowledge and abilities do they already possess? Some assumptions are made regarding those when students are admitted to universities.

We assume they had learned what they were supposed to learn at the lower levels of educational structure. If they did not and somehow cheated their way into the universities, the deficiencies will persist and eventually manifest in them as low quality products. The university does not perform miracles. If the society offers defective raw materials, it can only at best ameliorate the

effects at the output end of the processes. To assure quality in student output by the universities, the primary and secondary levels of the system must also ensure quality in their productivity.

- **University Professors:**

The public policy on higher Education recognizes that no education system may rise above the quality of its teachers). The quality of lectures in the universities determines largely, the quality of those that they produce and the quality of their research output. In the fifty years of the development of university education in Libya, there was a lack of orderly and prosperous growth, especially during the "People's Committee Rule of the education sector in Libya. The lecturers in the universities at the time were less world class. They had not integrity both personal and intellectual. The system was always not improving them through training and retraining in the best universities in the world.

- **Context:**

If the university has well, quality learners and professors but run irrelevant programmes that do not relate to the needs of the society nor with the “specifications” of the stakeholders and consumers, and then does quality in this context suffer. The national policy on education enjoins the universities to design course content that will reflect our national requirements.

It there is a continuing mismatch between what is offered in the universities and what society needs, then regardless of the nature of what is offered, it would still in this quality context be of poor quality. Context here must also be aligned with adequate and appropriate materials, and equipment for teaching and learning. Workshops, laboratories, libraries and modern technology like ICT go as required with the context.

- **Teaching:**

Teaching is separated here from teachers as a quality indicator because not much teaching goes on in the universities even with highly qualified academic staff in the department. Quality teaching involves not only possession of knowledge but also the ability to transfer knowledge, skills and attitudes to the learners. This is why the Educational public Policy envisages that all teachers in our educational institutions shall be required to undergo training in the methods and techniques of teaching these calls for training in methods and techniques in teaching.

- **Teaching/Learning Environment:**

Good learning environment promotes quality higher education. Environment here goes beyond the physical structures and beautiful aesthetic landscaping. Important though these are to quality learning, it includes adequate policies and practices, which prohibit students and teacher harassment, examination malpractice, cultism and attendant violence. It connotes good academic culture. At the early stages of University development in Libya there was adequate classrooms, offices hostel accommodation for students, large auditoriums for universities wide activities. The campuses were student friendly. With the radical increase in student enrolment that were not matched with corresponding improvement in facilities and funding, the existing facilities were over-stretched and ill maintained. They can no longer support the programmes of the universities leading to improvisation that have affected quality:

- **Measurement and Evaluation:**

Quality must be measurable and clearly defined. In other words, there should be clearly defined learning outcomes such as knowledge, attitudes and skills expected of anyone who has gone through any course of study in the university. There must be suitable ways of assessing these at university and national levels. From our discussion of indicator of quality education, we can identity possible assurance mechanism in the university. These are

a) Students admission policy

b) Recruitment and selection policy of academic staff

c) Circular policy (academic programmes)

d) Supervision of instruction and teaching effectiveness.

We here discuss how these mechanisms can be put in place if they are not already being used and or strengthened if they are:

- **Student Admission policy:**

Students are the raw materials that are taken into the university, processed and turned out on graduation as finished products to employers and society as customers. Admission standards in excellent universities are very high indeed. Only the finest candidates meet the requirements. The position of this presentation is that this move be strengthened to recover the autonomy of

universities in determining their raw materials. Also that policy enrollment and admission to the university level requirements.

- **Recruitment and Selection of Academic Staff:**

The universities have autonomy in this regard. They recruit and select their staff. The only limitation here is that they cannot fix their remuneration outside the authority approved structure which unfortunately cannot attract desired teaching personnel from anywhere in the world. Even at the present level of enhancement, the remuneration package of the Libyan university teacher is still lower than the average in the Arab world and this becomes an impediment to attracting lectures in relevant areas from some Arab countries, Europe, America, Japan and other key Asian countries.

The concept of the university requires that its academic staff disposition is universal in profile. That is why some culture specific programmes like foreign languages and high technologies, modern studies, Institutions of American and European Studies etc should for purposes of universal relevance and comparison have on their teaching staff, specialists from those cultures. Since quality has to do with relevance this obviously has a quality assurance implication.

- **Circular policy:**

This is a quality context. Quality assurance in the university must have to do with the relevance of the programmes. There must be societal justification for every programmed on the curriculum. It must be social, economic, political, cultural, environmental or some or all of these. This sees quality as relevance. It must have utility. It must not be an abstraction. Any Libyan University in the following areas can assure these:

(i) Periodic review of existing programmes to check on flaws breakdowns. This can be done every two years or by one year.

(ii) Review of objective in the light of changing needs and demands of the society.

(ii) Ensure that the procedure for modifying programmes (deletion and addition of courses) is not cumbersome. This way, outdated and irrelevant courses are quickly removed and new ones added.

- Supervision of Instruction and Teaching Effectiveness:

The quality of teaching has considerably declined in the Libyan universities. This may well be the reason why the National Policy on higher Education provides that all teachers in our national institutions shall be required of undergo training in the methods and techniques of teaching. Possession of knowledge is one thing; ability to transfer it to others is another. That is why university professor is discipline and teaching a profession.

In his inaugural lecture on the improvement of instruction and teacher effectiveness in our higher educational institutions, recommended among other things that student ratings of lecturers teaching at the end of courses) should be augmented by other approaches in making promotion decision on lecturers. That is why one cannot publish at the expanse of teaching and expect a favorable appraisal. They should complement each other.

CONCLUSION

This presentation have examined the necessity for quality assurance institutionalization in the Libyan university institution, and provided her as an indicators and concepts presented to the new public policy makers in new Libya. The indicators of quality, the production function of the university and the strategies universities can adopt, in the Libyan education system, to assure quality of their products.

It has becomes clear that universities have heavy responsibility in this regard. A task must be done because a system that does not assure quality of its products in a global market that is competitive will eventually become unsustainable. We must however realize that many if not all the strategies discussed here have funding implications. Those whose responsibility it is to fund universities should take those it is to manage these funds should take even more note actions so that the university institution in new Libya can truly begin to fulfill its mission.

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FAILURE ANALYSIS OF BELT CONVEYOR SYSTEM

Raghvendra Singh Gurjar

Department of Mechanical Engineering, MITS College Gwalior (M.P.) India

ABSTRACT

Compared with actual situation of the thermal power plant, this paper describes typical failure of the belt conveyor of coal handling system in thermal power plant. This paper focus on the condition, i.e. estimation of the scale of a problem; the most frequent failures, types and the location of failures and their importance in the context of maintenance of a conveyor belt transportation system. Some comments regarding possible ways for detection of mentioned faults are considered. The examples of failures and time related to replacement or repair have been provided.

Keywords: *belt conveyor; failure analysis; condition monitoring; solutions.*

INTRODUCTION

Belt conveyor is a commonly used equipment of continuous transport; it has a high efficiency, large conveying capacity, simpler construction, small amount of maintenance. Can be achieved at different distances, different materials transportation and is used in coal handling system in thermal power plant and other projects. Belt conveyor will often occur some typical problems in the course; this paper is based on research of common typical failure of belt conveyor during use, analysis the cause of failure, proposed some effective methods to solve the problems.

BELT CONVEYOR SYSTEM

The belt conveyor system (BCS) consists of

1. Belts
2. Idlers,
3. Rollers
4. Drive unit (electric motor, coupling, gearbox, pulleys),
5. Crusher

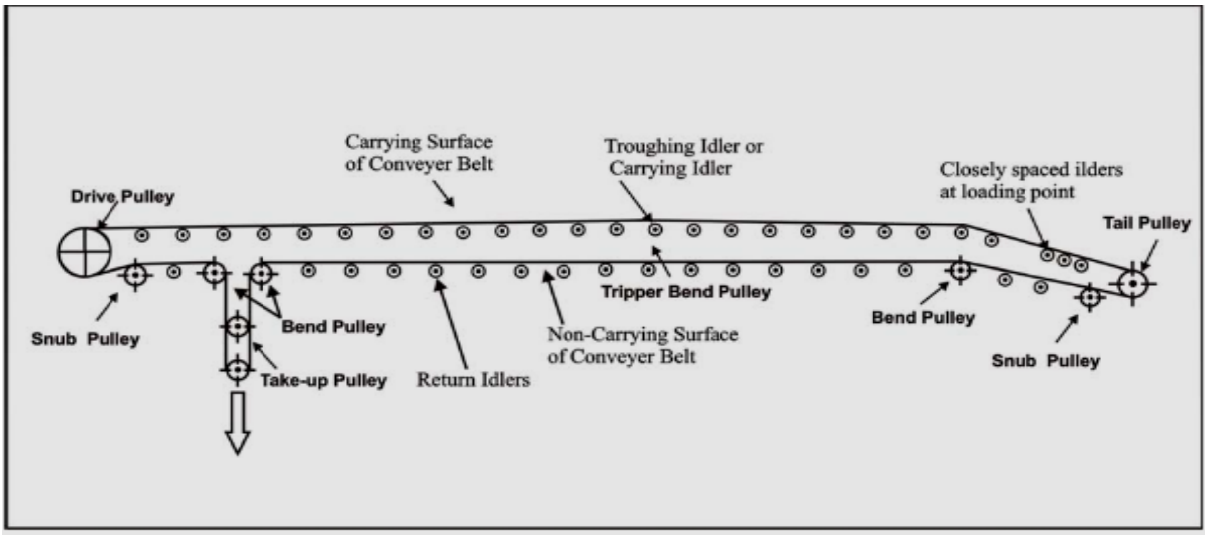


Figure 1 simple belt conveyor system

TYPES OF FAILURE IN BELT CONVEYOR SYSTEM

1. BELT

In this paper, the analysis of belt conveyors in the thermal power plant for coal handling process. The common problems are

1.1 Belts do not turn

After starting the motor idling belt drive pulley slippage, the belt does not start up, this failure is due to belt tension it is not enough to tension adjusting device, the belt is too long, heavy-duty starting, belts and more so on the end of the heap of coal causes.

1.2 Belt deviation

Deviation due to the belt in the operation of a lateral force generation, resulting in lateral force of the following reasons: Conveyor loading biased towards one side, and not installed in the middle position; roller and the roller axis with belt center is not installed vertical; inconsistent level of body wire; conveyor belt joint straight, not straight; unloading roller position is not adjusted; tail rollers, guide rollers can cause the belt does not adjust the deviation.

Adjusted deviation are generally carried out in the belt run, adjustments to the belt running direction and the direction of deviation, if the belt to the right deviation, on the side where the belt began to run down the conveyor belt rollers right axis direction side, or move along the transport direction of the left roller shaft, the roller left slightly forward tilt adjustment to adjust a few more rollers, each roller to transfer some less, adjust the belt will be excessive deviation to the other direction, to adjust the belt to the left deviation method as described above, an adjustment in the opposite direction; deviation when it occurs in the belt-driven rollers, tail rollers, unload roller, adjustable head frame, tail rack the side rail and bolt, before adjustment bolts at both ends of the roller shaft to relax in order to facilitate adjustment, adjusted to tighten, having a good deviation roller.

Figure 2 belt deviation

Figure 3 damage belt photo

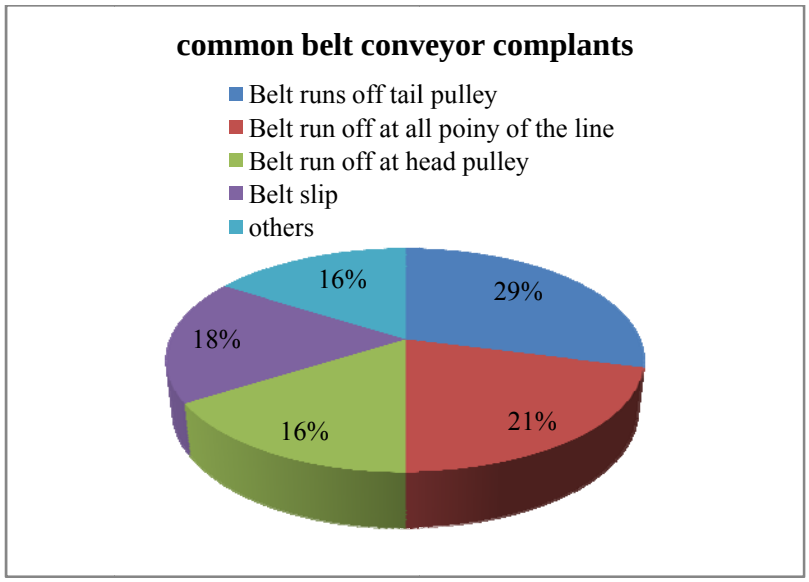


Figure 4 belt problems

2 IDLERS

The failure analysis of idlers is a other issue [1, 2, and 3]. Idler are used for supporting belt with transport materials. In some sense idlers are similar to pulleys and consist of bearing and shell. One may expect similar types of failures. The support system for belt consists of three idlers; because of different load of each idler usually side idlers are more subjected to damage. Worn Bearing in idlers will significantly increase external load for drive units so power consumption will increase. Damaged idlers and pulleys may be reason of damage for belts. The idlers are quite small in comparison to pulley; however, number of idlers is huge. Damaged idlers may cause failure of belt (the cut of a belt) or even may start fire (belt slipping on damaged idler may increase temperature up to 400^{o} C, 450^{o} C is the limit for so called “difficult-to-burn” belt) and as it was mentioned energy consumption is a rising dramatically. In the thermal power plants the total failure of idler in 117 times in all conveyors.


Figure 5 idler failure

3. ROLLERS

Each belt conveyor has lot number rollers; their work status directly affects the working of conveyor. According to the actual work of conveyor, roller in the conveyor system can be classified four kinds according their effect, trough roller, parallel roller, buffer roller and self aligning roller; according to the loads case can be divided two kinds, no-load roller and bearing roller. Trough roller use bearing branches of materials, play a supporting role and increased throughput role. Parallel roller is a long-shaped roller, for no-load branch of conveyor, to play a supporting role of no load branch tape; buffer roller is trough roller too. Flexible support trough roller be installed on conveyor load branch, Installed in the material office. Reduce the impact of material for conveyor belt, protect the tape and support bearing. Generally based on the elastic support were divided into rubber ring and spring plate; the role of self-aligning roller is a certain degree of automatic adjustment of conveyor belt deviation, to avoid excessive wear of belt and materials scattered. In the load and no-load branch are equipped with a number of self-aligning rollers. In the thermal power plants the total failure of Rollers in 107 times in all conveyors


Figure 6 roller failure

4. DRIVE UNIT

The drive unit consists of electric motor, damping coupling, two stage gearbox and coupling that connect output shaft with pulley (fig 7). A crucial object in this subsystem is gearbox. According to Matuszewski [4] in a considered lignite open coal handling system even 14 % of gear boxes may be replaced each year due to unexpected failures. These failures are related to the geared wheel wear or damages (broken tooth) and bearing (mainly over limit backlash due to environmental impact, also typical failures like outer/inner race, rolling element).

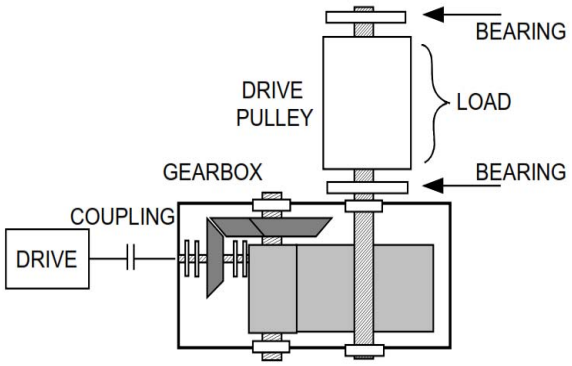


Figure 7 scheme of drive unit in belt conveyor system

4.1 Gearbox

It is the showing the number of failure for December2011-May 2012 in gearbox.

In this section will be consider the types of fault that

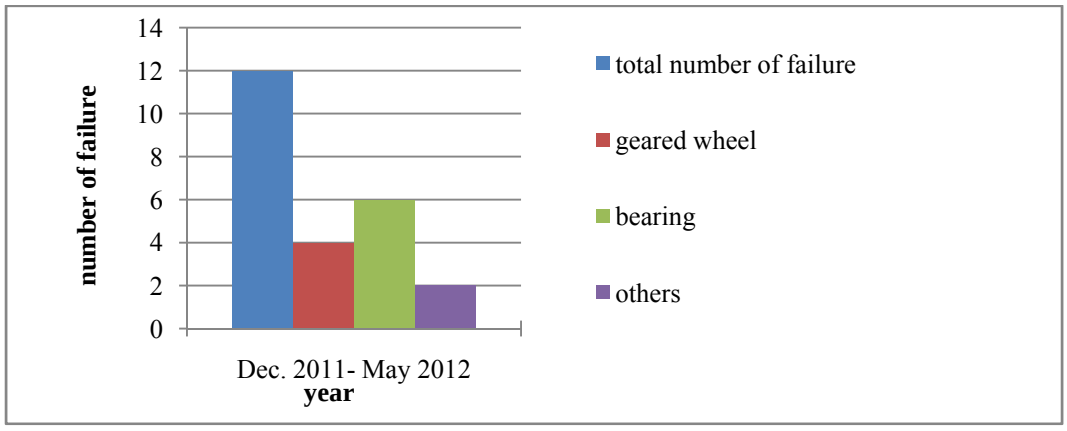


Figure 8 Number of failure of drive unit gearbox used in belt conveyor system

Analysis for drive units used in coal handling system done by [5] show that over 50% problems are related to bearing..

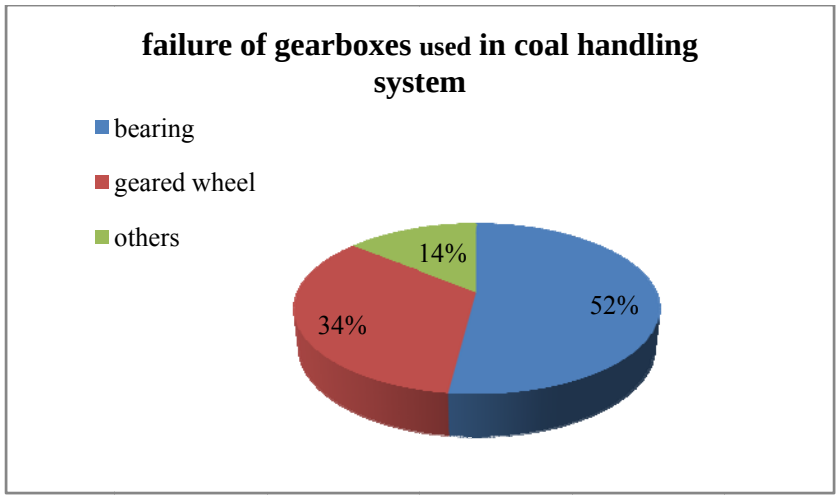


Figure 9 Percentage of failure for gearboxes used in coal handling system

Figure 10 Example of damaged geared wheel

4.2 Pulleys

The pulley consists of two bearing, shaft, coating and shell (special material in order to improve belt-pulley contact), fig.11

Figure 11 pulley

As it is shown on fig. (The number of failures depending on pulley type) especially drives are very sensitive elements.

As Matuszewski [4] shown number of pulley failures may reach over 60 per year that is 12% of used pulleys, figure12 one may notice two sources of primary problems, namely: bearing, coating and shell.

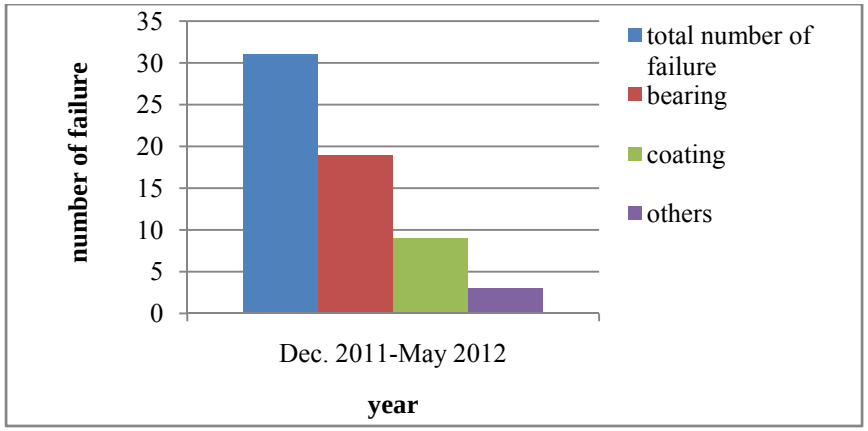


Figure 12 pulley failure

In fig.13 one may see examples of damaged pulley coating and bearing.

Fig. 13 Examples of pulley faults

Motor-Coupling-Gearbox-Pulley in Coal Handling System

In fig.14 the number of failure related to elements of drive unit is presented. As one may see the number of failure is more or less similar for each element, however the number of failures of pulley is in the highest value.

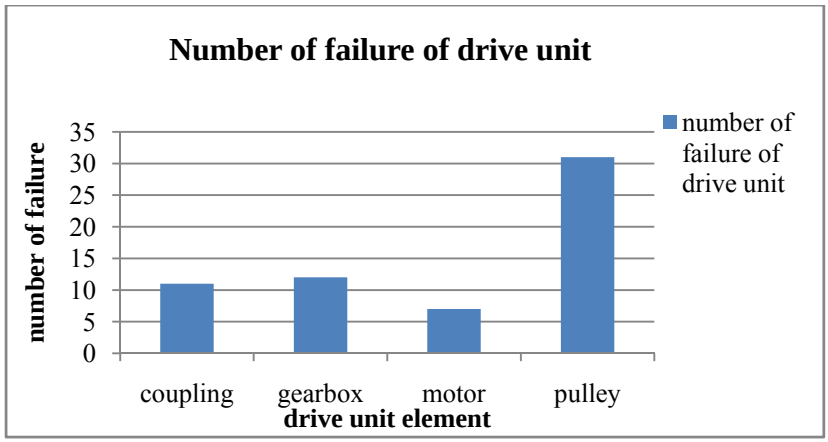
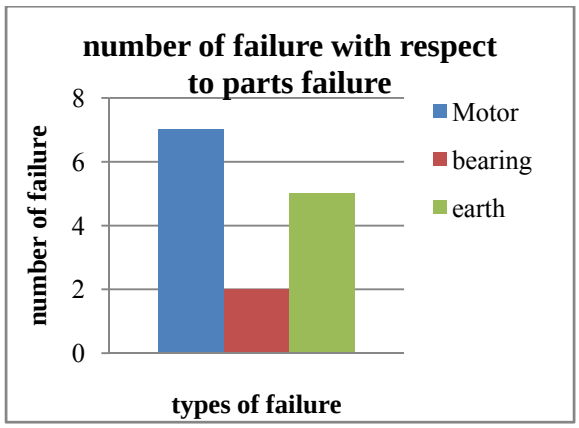


Figure 14 Number of failure related to elements of drive unit (motor-coupling-gearbox-pulley)

Figure 15 failures of coupling and electric motor

More interesting is to get information regarding failures with respect to type of failure. Figure 16 shows this information for motors and couplings and figure 17 provides similar information for gearboxes and pulleys.



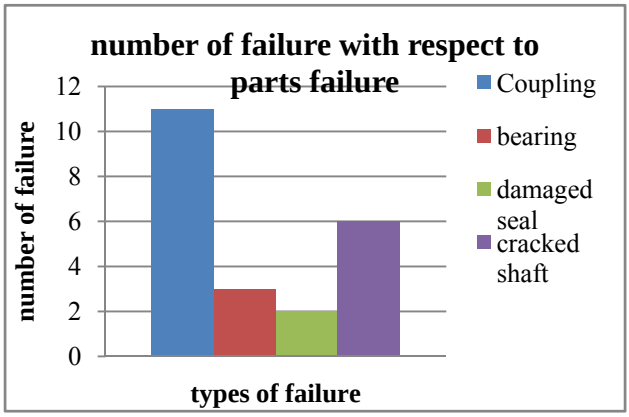


Figure 16 Number of failure related to drive unit elements with respect to type of damaged part

From figure 16 one may notice that for motors the most frequent failure is an electrical problem (earth). For couplings one may see that it is hard to select the dominated type of failure.

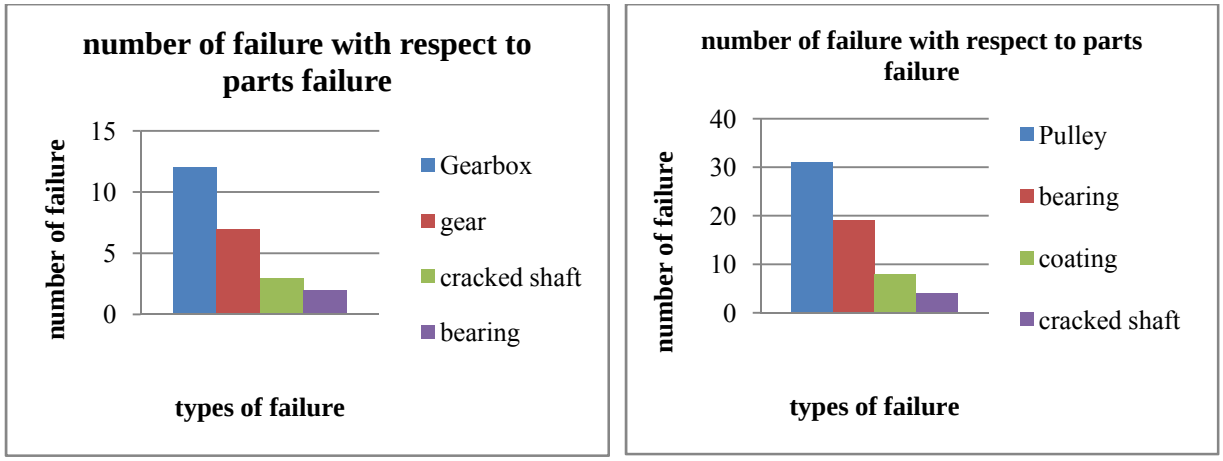


Figure 17 Number of failure related to drive unit elements with respect to type of damaged part

The most frequent failures for pulleys are: bearings and shells. For gearboxes number of failures related to geared wheels is 41%. Other critical failure is the damage of input shafts (probably because of overloading). It may be surprising that bearing faults are not so frequent in gearboxes.

5. CRUSHER

In the belt conveyor system the use of crusher is broken the coal in small sizes by the help of hammer. The failure of crusher mainly breaking of hammer. In the failure of crusher in the thermal power plant shown by the graph below

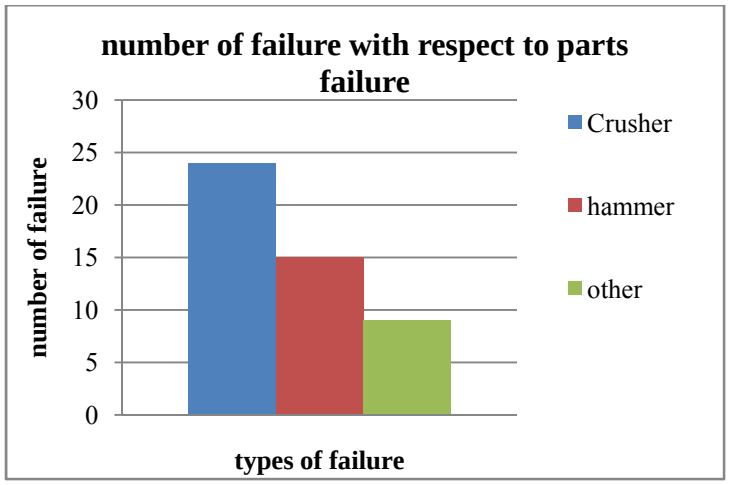


Figure 18 Number of failure related to crusher with respect to type of damaged part

SOLUTIONS

There is several remedy for short out of common belt conveyor problems are

- Adjusting the carrying idlers of belt conveyor across the middle of deviation. When the adjustable of roller adjust to the position of group deviation; in manufacture roller group are processed on both sides of mounting holes grow holes for adjustment. This specific method is based towards belt which side of the roller group toward which side of the belt forward direction or the other side after the shift. Belt idler upward direction deviation is located at the Group's next move should be to the left, the upper roller group at right.
- Install the self-aligning idler group of self-aligning idler group, the middle of many types, such as shaft type, four-link, vertical roll, etc. The principle is used to block or roller rotate in the horizontal direction within a block or generate horizontal thrust so belt automatically adjust the belt wandering heart to reach the purpose. The total length is generally shorter when the conveyor belt or belt conveyor using this method, two-way run-time is more reasonable, because a shorter belt conveyor easier to deviation and not difficult to adjust. And long belt conveyor is better not use this method because the self-aligning roller group life belt use would have some impact.
- Tension adjustment of belt tension at Deviation conveyor belt adjustment is a very important link. Tension at the top of the two heavy hammer bend pulley exception of the vertical length of the belt should be perpendicular to the direction of gravity away from the vertical, that is, to ensure the level of its axle center line. Using spiral tensioning or

hydraulic cylinder tensioning, the tension roller bearing should be accompanied by two translations, in order to ensure cylinder perpendicular to the axis and the vertical belt. The belt deviation of the specific adjustment method, and the roller at a similar adjustment

- For gearboxes (geared wheel and bearing) and pulleys (bearings) may use a vibration based monitoring [6] and temperature measurement for bearing condition monitoring.
- For idler condition thermograph measurement or noise may be used [7].
- For belt with steel cords nondestructive techniques may be applied(measurement of magnetic field of steel cords)[8].for belt joint for condition measurement some magnetic field source may be placed in a joint area and by the measurement of magnetic field the distance between these points may be easily calculated [9]. In order to detect cut of cover it was proposed by one of belt produce to place kind of electromagnetic field transmitter. If belt is cut, electric circuit will be damaged and transmitter will stop working [10, 11].

CONCLUSION

In this paper the problem of failure analysis of belt conveyor system has been considered. It is based on literature analysis, and failure reports from 20 belt conveyor in Parichha thermal power plant Jhansi. In this paper some failures are results of primary failures (damaged of belts due to pulley or idler faults, crack of shaft in gearboxes, pulleys, couplings is results of over loading due to increased turning resistance of idlers and pulleys). An application of condition monitoring methods has been also discussed. Depends on element of belt conveyor system different physical variables must be use (vibration, speed, current, magnetic field, temperature etc). However, failure analysis gives an opportunity to select first the most frequent failures, failures that lead to breakdown, primary failures (that forced to start secondary damages) etc. Some condition monitoring techniques can used in belt conveyor system like root cause analysis [12]. Than possible significantly improve the reliability of belt conveyor systems.

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CHARTING A COURSE OF DEVELOPMENT THROUGH PROPER TECHNICAL, TECHNOLOGICAL AND ENGINEERING EDUCATION

Olawale Olaniyi Emmanuel Ajibola

Department of Systems Engineering, University of Lagos, Lagos, Nigeria.

ABSTRACT

Knowledge refers to the possession of information, facts, ideas, truth or principles. The imparting and acquiring of knowledge through teaching and learning refer to education. The nucleus of education is knowledge. A well directed education is the process that yields knowledge. Engineering is the application of science in the design, planning, construction and maintenance of manufactured entity while Engineering education is the training of engineers for the purpose of initiating, facilitating and implementing the technological development of a Nation. Engineering uses scientific ideas to develop technology but technology provides the ingredient for Engineering. Technical education engenders formal preparation of Technicians for occupations between the skilled trades and the professions based on underlying sciences and supporting mathematics as well as methods, skills, materials, and processes of a specialized field of technology. In this work, the roles of these tier of education in the development of a nation was discussed in relation to the existing developmental efforts made towards achieving technological advancement in Nigeria. It is hoped that the policy makers in Nigeria will find the paper useful for the betterment of hoi polloi by charting a course of developing the entity called Nigeria through well-found technical, technological and engineering education.

Keywords: course of development, technical education, technological education, engineering education,

INTRODUCTION

Technology refers to the application of scientific knowledge to the practical aims of human life or, as it is sometimes phrased, to the change and manipulation of the human environment, Britannica (2008). It is the study, development and application of devices, machines and techniques for manufacturing and productive processes; the sum of a society's or culture's

practical knowledge, especially with reference to its material culture, Microsoft Encarta (2009). Technology could also be conceived as a method or methodology that applies technical knowledge or tools. In the most casual form, it could mean machines, equipment and systems considered as a unit. Technology is the nucleus of the subject matter of this paper. Technology is sometimes confused with engineering; it is often mistaken for machinery or computing device but Technology embraces more than machines as it also involves processes. Engineering uses scientific ideas to develop technology, Falade, (2010). And the scenario is the same for technological and engineering education.

Technical education is the academic and vocational preparation of students for jobs involving applied science and modern technology. It emphasizes the understanding and practical application of basic principles of science and mathematics, rather than the attainment of proficiency in manual skills that is properly the concern of vocational education. Technical education has as its objectives the preparation of graduates for occupations that are classed above the skilled crafts but below the scientific or engineering professions. People so employed are frequently called technicians. Technical education is distinct from professional education, which places major emphasis upon the theories, understanding, and principles of a wide body of subject matter designed to equip the graduate to practice authoritatively in such fields as science, engineering, law, or medicine. Technical occupations are vital in a wide range of fields, including agriculture, business administration, computers and data processing, education, environmental and resource management, graphic arts and industrial design, and health and medicine; technical educational curricula are correspondingly specialized over a broad range of disciplines. Technical education is typically offered in post-high-school curricula that are two years in length, but they are not designed to lead to a bachelor's degree, and are offered in a wide variety of institutions, such as technical institutes, junior colleges, vocational schools, and regular colleges and universities, Britannica (2008).

In the early millennia of human existence, a craft was acquired in a lengthy and laborious manner by serving with a master who gradually trained the initiate in the arcane mysteries of the skill. Such instruction, set in a matrix of oral tradition and practical experience, was frequently more closely related to religious ritual than to the application of rational scientific principles. Craft training was institutionalized in Western civilization in the form of apprenticeship, which has survived into the 20th century as a framework for instruction in technical skills. Increasingly,

however, instruction in new techniques has required access both to general theoretical knowledge and to realms of practical experience that, on account of their novelty, were not available through traditional apprenticeship. Thus the requirement for a significant proportion of academic instruction has become an important feature of most aspects of modern technology. This has accelerated the convergence between science and technology in the 19th and 20th centuries and has created a complex system of educational awards representing the level of accomplishment from simple instruction in schools to advanced research in universities. French and German academies led in the provision of such theoretical instruction, while Britain lagged somewhat in the 19th century, owing to its long and highly successful tradition of apprenticeship in engineering and related skills. But by the 20th century all the advanced industrial countries, including newcomers like Japan, had recognized the crucial role of a theoretical technological education in achieving commercial and industrial competence.

The application of science in the design, planning, construction and maintenance of manufactured entity is called Engineering. Engineering education is the training of engineers for the purposes of initiating, facilitating and implementing the technological development of a nation, Ajibola (2011). It is a very important area of human endeavour in the sense that engineering is the life support for developing, growing and maintaining the economy of any nation irrespective of the level of economic advancement attained by the nation. Engineering is the application of Science for the efficient utilization of natural resources to produce wealth. It has also been defined as the "application of laws governing forces and materials of nature through research, design, management and construction for the benefit of mankind, Musa Alabe (2009).

ENGINEERING EDUCATION AND PRACTICE IN THE UNITED STATES

The recognition of the importance of technological education, however, has never been complete in Western civilization, and the continued coexistence of other traditions has caused problems of assimilation and adjustment. The British author C.P. Snow drew attention to one of the most persistent problems in his perceptive essay, The Two Cultures (1959), in which he identified the dichotomy between scientists and technologists on the one hand and humanists and artists on the other as one between those who did understand the second law of thermodynamics and those who did not, causing a sharp disjunction of comprehension and sympathy. Arthur Koestler put

the same point in another way by observing that the traditionally humanities-educated Western man is reluctant to admit that a work of art is beyond his comprehension, but he will cheerfully confess that he does not understand how his radio or heating system works. Koestler characterized such a modern man, isolated from a technological environment that he possesses without understanding, as an "urban barbarian." Yet the growing prevalence of "black-box" technology, in which only the rarefied expert is able to understand the enormously complex operations that go on inside the electronic equipment, makes it more and more difficult to avoid becoming such a "barbarian." The most helpful development would seem to be not so much seeking to master the expertise of others in our increasingly specialized society, as encouraging those disciplines that provide bridges between the two cultures, and here there is a valuable role for the history of technology.

America, the prime of technology, has an outstanding history of technology. The case of God's own country is a pointer to the fact that Nigeria is not yet prepared to plan for the much desired technological development and so the dream of vision 20:2020 will ever remain a mirage because none of the indicators for the take-off of successful planning has been put in place. To start with, Nigeria cannot make an accurate statement about her population. The United States of America that is primed as the world's best economy and the world's power is no doubt the most advanced country in the world. Despite her technological prowess, the government of the United States in recognition of necessity to further climb the ladder of development attempted to redefine the blueprint of her economy. The government commenced her planning from the basis; the Committee on the Education and Utilization of the Engineer to investigate educational aspects of the preparation of engineers in the United States was commissioned to provide the springboard to kick-start the new phase of development in technology. One of the four panels established by the committee is the panel on Technological Education, Engineering Technology Education (1985). The recommendations of the panel as contained in the executive summary of their nine chapter report include:

- Student chapter of engineering related associations be encouraged by the associations and faculty sponsors in order to provide students with additional contacts and activities with national societies and their representatives
- Cooperative education in all of its forms should be expanded through greater industrial, institutional, and governmental support, with faculty industry linkages being encouraged

- "Hallmark" programs in engineering technology should be identified, publicised, and supported nationally
- Appropriate accrediting agencies should play a greater role in efforts to increase the quality of engineering technology programs
- Students should be prepared for and encouraged to seek technician certification
- Professional registration or certification of engineering technology faculty should be encouraged
- Manpower statistics on enrolment, degrees, and salaries should be maintained at the college, state and national levels.

Finally, the panel considered resource allocation pattern of various institutions as regards areas of engineering technology, and the following recommendations were developed:

- Institutions should plan to develop a limited number of "centres of emphasis" in subspecialties
- Continuing efforts should be made to upgrade laboratories and shops, recognizing the importance they play in the education of engineering technicians and technologists
- Linkages with industry should be developed to share specialized laboratory and shop facilities, both in industry and on campus.

Other recommendations referred to as "specific recommendations" were not considered this paper for lack of space. But one thing that is sure is that these recommendations among others shall be implemented to the letter because the factor of "corruption" will not come into play in the US. The consideration here is that 'if a country like the US could still place emphasis on all the facets of Engineering education with special consideration for technical education' then Nigeria should as a matter of urgency revive engineering education at all levels

ENGINEERING EDUCATION AND PRACTICE IN NIGERIA

The ultimate goal of any nation striving to develop its technological prowess concerns the quality of life of her citizenry hence the relationship between technology and the society cannot be overemphasized. There is no doubt that technology has brought a higher standard of living to people in advanced countries, just as it has enabled a rapidly rising population to subsist in the developing countries. It is the prospect of rising living standards that makes the acquisition of technical competence so attractive to every country the world over. Although it is a worthy

desire to possess a comfortable sufficiency of material goods, and leisure for recreative purposes, the quality of a full life in any human society has other even more important prerequisites, such as the possession of freedom in a law-abiding community and equality before the law. Certainly, highly oppressive regimes have used technological devices to suppress individual freedom and to secure obedience to the state especially in Africa. However, high technological competence requires a high level of educational achievement by a significant proportion of the community holds out the hope that a society that is well-educated will not long endure constraints on individual freedom and initiative that are not self-justifying. In other words, the high degree of correlation between technological success and educational accomplishment suggests a fundamental democratic bias about modern technology. It may take time to become effective, but given sufficient time without a major political or social disruption and a consequent resurgence of national assertiveness and human selfishness, there are sound reasons for hoping that technology will bring the people of the world into a closer and more creative community. And Nigeria must not be left out in the scheme of things.

The hope of anybody who takes a long view of the history of technology as one of the most formative and persistently creative themes in the development of mankind from the Palaeolithic cave dwellers of antiquity to the dawn of the space age in the 20th century is deep-rooted in the ability of technology to promote the quality of life. Above all other perceptions of technology, the threshold of space exploration on which mankind stands at the end of the 20th century provides the most dynamic and hopeful portent of human potentialities. Even while the threat of technological self-destruction remains ominous, and the problems of population control and ecological imbalance cry out for satisfactory solutions, man has found a clue of his own future in terms of a quest to explore and colonize the depths of an infinitely fascinating universe. As yet, only a few visionaries have appreciated the richness of this possibility, and their projections are too easily dismissed as nothing more than imaginative science fiction. But in the long run, if there is to be a long run for our uniquely technological but wilful species, the future depends upon the ability to acquire such a cosmic perspective, so it is important to recognize this now and to begin the arduous mental and physical preparations accordingly. The words of Arthur C. Clarke, one of the most perceptive of contemporary seers, in his Profiles of the Future (1962), are worth recalling in this context. Thinking ahead to the countless eons that could stem from the remarkable human achievement summarized in the history of technology, he surmised that the

all-knowing beings who may evolve from these humble beginnings may still regard our own era with wistfulness: “But for all that, they may envy us, basking in the bright afterglow of Creation; for we knew the Universe when it was young.”, Britannica 8.0 (2008).

There are so many technical institutions in Nigeria today; so many technical institutions have been developed at the technical college, polytechnic and university levels. However, many of these institutions don’t have adequate infrastructure. There are no teachers of high quality; even the motivation among students is very low because of the societal disdain that doesn’t accord the necessary recognition to technical education such that many students don’t want to attend technical institutions, Aina (2011). Other identifiable problems facing the trio of technical, technological and engineering education as enumerated by Ajibola, O.O.E, in his paper title “an expository analysis of problems and prospects of engineering education in Nigeria” are:

- Inadequate Funding from the Federal Government
- Inadequate Government Allocation to Education in Nigeria (1970 -2002)
- Inadequacy of the Academic Content
- Staffing Problem
- Poor Infrastructural Facilities
- The Disconnect between Classroom and the Industry
- Intermittent Parental Intrusion into the Educational Structure
- Students’ Lack of Will to Invest in their own Future
- Negative Influence of Political Office Holders on On-coming Generation
- The Erasure of Moral Fabric in Africa
- The Ill-implemented Industrial Training Programme

Our reward system is also faulty. A psychological reward is a process that reinforces behaviour; something that, when offered, causes a behaviour to increase in intensity. Reward is an operational concept for describing the positive value an individual ascribes to an object, behavioural act or an internal physical state. Natural rewards include those that are necessary for the survival of species, such as eating, drinking, sex, and fighting. Secondary rewards derive their value from the primary reward, and include shelter, money, pleasant touch, beauty, music, etc. The functions of rewards are based directly on the modification of behaviour and indirectly on the sensory properties of rewards, Wikipedia (2011). For instance, altruism may induce a larger psychological reward, although it doesn't cause sensations. Rewards are generally

considered more effective than punishment in enforcing positive behaviour. There is no doubt that it is the best brains that study technological based subjects. However, the reward system in Nigeria is to say the list, awkward. Remunerations and other inducing factors for engineering related disciplines are embarrassingly insulting even in an engineering firm:

- While an accountant is placed on a salary of N250,000.00 and above, the engineering graduate is expected to receive N15,000.00.
- His office is housed in a wooden carton whereas his counterpart who read Personnel management is housed in the Management building with full blast air-conditioning system.
- He does not get promoted at the same time as his counterpart Legal department of the same establishment, and
- The responsibility of maintenance of all the facilities which others enjoy with an exception to him rests on his shoulders.

In his paper titled "Technical and Vocational Education: Key to Nigeria's Development", Dike, V.E. did an extensive exposition of the implications of the deletion of technical education from the educational structure of a hitherto developing nation called Nigeria. He reiterated the fact that our engineering educational system has collapse for lacking in foundation. "While technical and vocational education has continued to strive in many societies Nigeria has neglected this aspect of education. Consequently, the society lacks skilled technicians: bricklayers, carpenters, painters, and auto mechanics; medical laboratory and pharmaceutical technicians, electrical/electronic technicians and skilled vocational nurses". The consequence of the aforementioned is the dearth of technically skilled labour which translates to the lack of lubricant necessary to facilitate the smooth running of the engine of development in Nigeria. The aftermath of excluding technical education in the scheme of development in Nigeria is the collapse of the technological education and by implication, the university education. The absence of the technical inputs from the products of technical and vocational institutions in the graduates from both institutions has reduced such graduates to diploma/degree certificates carrying apprentices. The shabby performance of builders; building technologists, mason and bricklayers is no longer news. That individual or enterprise that has important projects to execute in Nigeria relies on the competence of technicians from neighbouring countries to draw his workforce from. It therefore behoves on the stakeholders to embrace technical education and fine-tune all the other parameters required to strengthen both the technological and university education.

Although technical education produces the apparatus for running the technological and engineering education, the latter produces new technology while the formal acts as the interface between the technical and the engineering education. Technicians, technologists and engineers are produced from technical colleges, polytechnics and universities respectively. The availability of these personnel in the right proportions in an organization promotes rapid industrialization in the presence of enabling environment and appropriate infrastructure. The thrust of research in engineering education is the generation of scientific knowledge and application of it in the production of scientific and technical manpower, the development of material processing systems, the production of machinery and equipment for general and specialized functions and the application and service needs of the society. Research is generally directed at discovering, creating and adding to a pool of knowledge. Such research results are disseminated by researchers to the industry through the training of the students by incorporating the research findings in their classroom activities thus enriching both teaching and learning situation within the department; and the students are later employed to work in the industry where ideas are shared among the other employees. The findings can also be transferred directly to the industry via seminars, workshops and conferences etc. This promotes the development of endogenous technology and advancement in productivity, Falade (2004). The difference between a developed, rich and prosperous country and the developing or underdeveloped country is the difference in their level of scientific, engineering and technological advancement

DISCUSSIONS

Nigeria was a forerunner in the development and exploitation of technical education for the improvement of the life of her citizens. In the pre-colonial era, the workforce of the country was technical education driven. The evidence of the assertion can be seen in decayed infrastructure called Federal Government Technical College, Yaba which glory had been subsumed by that of Yaba College of Technology which shares the same fence with the institution. In 1960s, 1970s and early 1980s for instance, there were standard automobile, carpentry and metalwork workshops which provide qualitative services at modest prices to members of the populace who appreciate the quality of services they offer. The Federal Government of Nigeria, recognizing the prospect of Technical education formulated a policy that made it mandatory for every State and Local Government in Nigeria to establish at least a Technical College in its domain. Most State

government conformed to the policy; there was no record of any Local government that executed the policy largely due to their lack of political will or their ignorance of the import of technical education. Although compliance with the policy statement was not total, the impacts of the Technical colleges were felt and the economy was better it. The technical education at that time provided the knowhow for the low-level manpower the purpose for which it was meant to achieve. However, funding as it is the case with any other institution owned by government was grossly inadequate causing the fortune of technical colleges to dwindle. The advent of the Colleges of Technology/Polytechnics and the Universities with multifarious areas of specialization designed to cater for middle level and high level manpower respectively have exacerbated the success records of technical colleges as the attention of governments at various levels shifted from the low level manpower production.

Technical education is no doubt very expensive so it requires strong political will to for people to put the money where their mouth is. Also at the policy formulation level majority of the technocrats who are in charge of policy formulation don't have technical education background, so they tend to concentrate more on their fields at the expense of technical education so when experts are required they seldom invite experts on technical education and consequently, technical education is rarely talked about. That foreigners constitute the large chunk of the technical labour force in Nigeria portends that we lack leadership and adequate manpower in that area. It also portends that we lack planning, that is based on manpower cannot be adequately done especially when you remember that many of the national developmental plans have failed, not as a result of inadequate paper work, but as a result of inadequate manpower particularly in the middle level cadre. It is a pity that technical education, with all its potential, has not been fully realized in Nigeria and the omen is not good, Aina (2011). Very recently, giant strides were taken by government at various levels to resuscitate technical education, some of which were considered below, viz.:

Committee on repositioning technical education in Nigeria: The cycle of technical education which must translate to development must be based on the tripod stand with the three levels of education as its legs such that the university education provides the pedestal for modeling an idea as conceived by science, design the model based on the model and interpret the design to the technologist(s); the product of technological education that supervises the execution of the

design with the technicians, product of technical education as the foot soldiers who carry out the actual execution under strict supervision of the technologist. Shortly after his election in the year 1999, President Olusegun Obasanjo, who seemed to have recognized that there was a missing link in the education cycle of development commissioned a Committee on repositioning technical education in Nigeria; the committee that was headed by Professor Olu Aina came up with a blueprint, which was a terrific report that would have been a springboard for the realization of technical education in the country; unfortunately, like several other reports, it languished on the shelf for a very long time until sometimes in year 2003 when the Education Trust Fund dusted the report for possible implementation. The substance of the attempt has not been translated into tangible development; it hoped that efforts will transform to visible result in the nearest future.

Seminar on repositioning of education: Driven by the hue and cry about decadence in education in the country, stakeholders in education were making contributions in their own ways; one of such stakeholders is the National Assembly; about three years ago, the National Assembly organized a seminar with the aim to reposition education where notable stakeholders in technical and technological education presented papers and the import of technical education was brought to the fore as a prerequisite to Nigeria's pursuit of developmental goals and consequent attainment of vision 20:2020. If action could match words from such fora then Nigeria's hope of achieving the much touted Millennium Development Goals (MDGs) will come alive. Nevertheless, no visible action succeeded the seminar except further disintegration that had further aggravated the state of education in Nigeria. For instance, the epileptic power supply that had crippled the manufacturing sector in the country had not been traced successfully to inadequate power generation but there is clear evidence that the technical insufficiency of the staffers of technical departments of PHCN contributed to the systemic malaise of the organization. And the fact that corruption in PHCN matches that of the Nigerian Police, according to Transparency international, is a product of technical incompetence. Competent staff has integrity. The reason why the members of the three arms of the military namely; the Nigerian Air Force, the Nigerian Army and the Nigerian Navy have not found dignity in massive corruption as opposed to their counterpart in the Nigerian Police is attributable to discipline born out of competence. An engineer in training without input from vibrant set of technicians is a

disaster. An engineering design without proper implementation by unlettered labourer results in underdevelopment.

Giant stride by State Government: The present government of Osun state is fascinated about skill development especially for the youth and she is prepared to facilitate the process of achieving a hundred percent skill acquisition for her teaming youth in a scheme tagged "Life Skill", Aina (2011). To this end, the administration of Governor Aregbesola had refurbished the state government owned technical college in Osogbo and he is willing to replicate the action in all other such institutions in the state. Nevertheless, the situation will remain unchanged if competent staffs are not sourced to provide the necessary impetus needed to achieve the desired goal. In addition, there must be an enduring policy to back the actions taken today to procure the future for the effort.

Lagos State is one state that is striving to live up to its slogan, "Centre of Excellence" by aggressively embarking upon reconstruction of her educational structures in general, replacing dilapidated building by mega-structures, introducing functional cancelling departments in all secondary schools to mention but a few. However, very little has been done in the area of technical education in the state.

The 6-3-3-4 System of Education: According to Professor Olu Aina the 6-3-3-4 system of education did not succeed but it did not fail completely. The system fell short of the level of expectation of the planners due to the following factors:

- Lack of political will
- Improper planning, and
- Inadequacy of data

He opined that, within a few years of the commencement of the programme, there was an explosion in school population far in excess of expectation and what was planned for. For instance, classroom that was built for 20 was housing 50, so there were 30 children who could not find seats thus reducing the contacts between pupils and teachers from 30 to 1, to 50 to 1. Other problems that robbed the system of success include "poor planning". For example, there was no provision for the laboratories/workshop to provide shelter for the multimillion equipments the government supplied to various secondary schools at the commencement of the

programme. I was privileged to serve in a secondary school in Ikere-Ekiti on the National Youth Service Corps (NYSC) scheme. In the school where I serve, all the equipment supplied to the school for the implementation of the Junior Secondary School (JSS) scheme had rotten for lack of shelter. There was not a single technician of technologist on the staff list of the school which translate to lack of manpower to operate and maintain the equipment in case the systems were to be put to use. It became clear that the progenitors of 6-3-3-4 system of education may not be sincere with the programme after all.

CONCLUSION

South Korea was at a time at the same level of development with Nigeria and India but they are far ahead of Nigeria now because they paid attention to technical education. The advanced nations of today were Neolithic communities of yesterday. Nigeria is not an underdeveloped state since it has surpassed the Neolithic stage; just that it is still a toddler at 50. Rather than dissipating all its energy on political zoning formula the ruling class should summon the political will required to foster rapid development of purposeful engineering technological education with credible impetus garnished with dedication, determination and devotion.

RECOMMENDATIONS

Nigeria is a nation of oddity where the unconventional is the convention. Nevertheless, it is recommended that:

- In the scheme of development, the role of the three tiers of engineering education namely; technical education for technician, technological/polytechnic education for technologist and university education for engineers should be clearly defined so that whatever the background of the technocrats in charge of technical education at any point in time, the substance of the project will not be altered.
- The current trend where emphasis is placed on paper certificate has eroded the ethic of commensurate reward for hard work. The university certificate is fast become of less quality to the secondary school certificate of the 70s because people who seek degree do so as an end and not as a means to an end. Those who do have business being in the university are seeking to graduate with a first class. Someone whose destiny is contented with technician certificate will definitely be a failure with First class in Electrical engineering.

- In line with the mind of the government of the USA, it is recommended that the document policy on engineering technology education as summarized in this paper be adopted wholly with amendments to accommodation our peculiar situation. However, the peculiarity should not be accommodative of corruption and other vices that share the peculiarities of corruption.
- The federal government should stop the award of licence to corrupt official and organizations under any guise to establish universities whose products cannot compete with technicians from India. They should rather concentrate on the technician cadre development for now so that the ratio of technician/technologist to engineer can be improved upon.
- Existing federal universities should be audited and well funded. Programme rationalization should encourage in line with strength of existing institutions and the peculiarities of geographical areas.
- Establishment of new polytechnics and universities should be stopped forthwith to pave allowance for adequate planning and funding of existing ones. The current where government just establish an institution of higher learning to satisfy geographical distribution is not profitable in anyway.
- After all the aforementioned are properly implemented, the federal government should design a viable blueprint that will serve as a springboard for national development.

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FAILURE ANALYSIS OF TAPER DIE OF BIOMASS BRIQUETTING MACHINE: A REVIEW

Kapil A.Pakhare

M.Tech scholar, Department Of Mechanical Engineering, GHRCE, Nagpur

Dr.R.N.Baxi

Professor, Department Of Mechanical Engineering, GHRCE, Nagpur

ABSTRACT

The present review provides brief information about the various types of biomass briquetting machine. [1] This technology also helps to reduce cost and production time, and improve Productivity, and eventually lead to be able to survive in competitive environments. [2] Experimental investigation of common reeds (Phragmites australis) particles compacting in closed die had been realized by laboratory hydraulic press equipment. By eliminating individual machines, the great savings in space, material handling and worker, and the improved efficiency can be realized. This paper review the various concepts

of biomass briquetting machine. The renewable energy technologies were selected for promotion within the programme : photovoltaics, renewable energy-based drying and biomass briquetting/ briquette-fired stoves. This paper gives brief review about the biomass briquetting machine, taper die and hydraulic press which is a part of briquette machine with the help of CAD/CAM technology.

Keywords*: Biomass Briquetting Machine, productivity, taper die*

1. INTRODUCTION

The briquette is an alternate source of energy. In Biomass Briquetting Plant, A Taper Die or sleeve is used. it is a device to extract the finish biomass product through it. The briquetting press is a reciprocal crank type mechanical press with flywheel. One flywheel is driven by the main motor through continuous flat belt. Forced lubrication oil circulating system guaranties a long service life. The ground material is fed through a hopper by means of a screw conveyer with its own geared motor. The vertical screw pre compresses and forces the material downwards in to the feeding chamber. From the chamber the materials forced by the ram through a tapered die system on to the cooling track in the form of briquettes. Briquettes formed are cylinder shape. Which are pushed through cooling tracks under slight pressure for

cooling and transport to packing point where the briquettes are packed and ready for dispatch to local area or other place.

The biomass briquettes are substitute for coal and L.P.G., and research is going on. The Biomass briquettes are made up of renewable source of energy. We all are well known by the importance of Energy and its sources. Energy is the key factor in economic development of every country. The demand of energy is increasing day by day and the supplies of sources are limited. It is globally red alert for fossil fuel like Petrol, Kerosene, Natural Gas, LPG, and Lignite etc. This has made a huge gap between the demand and supply of energy. Renewable energy is the ultimate solution, which can fill this gap. Most of advanced countries has adopted this concept, accepted this project and retaining their natural resources to get the solution of energy and fuels. The table show the comparison between coal and biomass characteristics as shown in table 1.

Table 1: Comparison Coal and biomass characteristics

Fuel	Density g/cm^3	Calorific value Kcal/Kg	Ash content %
Coal	1.3	3,800-5,300	20-40
Biomass briquettes from :			
Saw dust	1.1	4,600	0.7
Ground nutshell	1.05	4,750	2.0
Rice husk	1.3	3,700	18.0
Sawdust cotton	1.12	4,300	8.0

2. LITERATURE SURVEY

2.1 Design and Development of a Compact Screw-Press Biomass Briquetting Machine for Productivity Improvement and Cost Reduction.

Teerapot Wessapan , Nisakorn Somsuk and Theerapong Borirak

In this paper, the authors conclude that the compact machine which combines three functions including crushing, mixing and briquetting in a single unit is able to improve the production

cost and productivity. From comparison between the new and the existing/traditional briquetting system, it was found that when using the compact briquetting machine, the required production area, production time and operating cost are reduced by 67, 16, and 22% respectively when using the compact machine.

Briquetting process is a process of compaction of residues into a product of higher density than the original raw material. In compaction stage, the charcoal is crushed into very small size as a carbonized powder. Then the powder and some binder are completely mixed at a predetermined mixing ratio. After that the mixture is brought into the molding machine to form the briquettes. The briquettes are dried and cooled.

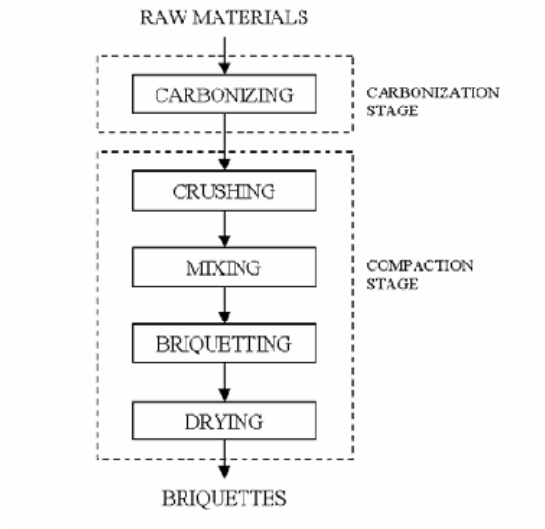

Fig. 1 Biomass briquetting process

An overview of the process flow is shown in Fig.1.There are several methods available for briquetting biomass. In developing countries, the well-known briquetting method that is suitable for small-scale applications is the screw-press briquetting. The raw material from the hopper is conveyed and compressed by a screw in the briquetting machine. This process can produce denser and stronger briquettes compared with piston presses.

2.2 Briquetting Mechanism analysis for solid biofuel production.

Edgars Repsa, Eriks Kronbergs, Mareks Smits

In this paper, the authors conclude that The shape of force – displacement characteristics of compacting of different size reed particles were similar – nonlinear curves with two

quasilinear parts.The designed rhomboid mechanism (Patent LV 14201) piston force – displacement characteristics are nonlinear curves with two quasilinear parts like characteristics of compacting reed particles in a closed die. The designed rhomboid mechanism with the member size 1.012 and 0.42 m is suitable for compacting of the smallest particles (including 7 – 8 mm size), if 35 g briquette is pressed in one stroke.

2.2.1 Materials and methods

The main task of this investigation was determination of the compacting force-displacement characteristics from compacting of different size common reeds particles. The compaction experiments had been carried out in a closed die with diameter 35 mm by means of laboratory hydraulic press equipment (Fig. 2). The maximum pressure 212 MPa had been achieved in compacting. The dosage of 35 grams of chopped common reeds particles was used for every briquette pressing.

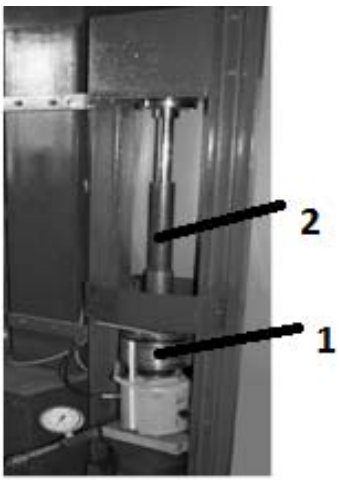

Fig. 2 **Hydraulic press:** 1 – press cylinder; 2 – closed die

2.3 Using Agricultural Residues as a Biomass Briquetting: An Alternative Source of Energy.

Maninder, Rupinderjit Singh Kathuria, and Sonia Grover

In this paper, the raw material including rice husk, coffee husk, saw dust, ground nutshell and cotton stalks etc. were densified into briquettes at high temperature and pressure using different technologies. We discuss the various advantages, factors that affecting the biomass briquetting and comparison between coal and biomass briquetting.

2.3.1. Biomass briquetting process

Briquetting is the process of densification of biomass to produce homogeneous, uniformly sized solid pieces of high bulk density which can be conveniently used as a fuel. Depending upon the type of biomass, three processes are generally required involving the following steps:

1. Sieving - Drying - Preheating - Densification - Cooling – Packing
2. Sieving - Crushing - Preheating - Densification - Cooling – Packing
3. Drying - Crushing - Preheating - Densification - Cooling – Packing

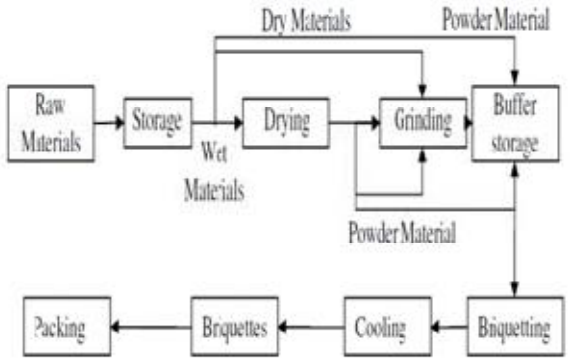

Fig 3. Flow diagram of biomass briquette production

The overview of biomass briquette production process is shown in fig 3.It is concluded that two biomass briquetting technologies dominate the Indian market: the ram and die machine and the screw machine. These two machines use different processes to densify sawdust and agricultural waste, and the end products also have different densities and shape. The hydraulic press has not been used in India and is considered unsuitable for Indian raw materials.

3. BIOMASS BRIQUETTING TECHNOLOGIES

Biomass densification represents a set of technologies for the conversion of biomass residues into a convenient fuel. The technology is also known as briquetting or agglomeration. Depending on the types of equipment used, it could be categorized into five main types:

3.1 Piston press densification

3.2 Screw press densification

3.3 Roll press densification

3.4 Pelletizing

3.5 Low pressure or manual presses

3.1 Piston press densification

There are two types of piston press 1) the die and punch technology; and 2) hydraulic press. In the die and punch technology, which is also known as ram and die technology, biomass is punched into a die by a reciprocating ram with a very high pressure thereby compressing the mass to obtain a compacted product. The standard size of the briquette produced using this machine is 60 mm, diameter. The hydraulic press process consists of first compacting the biomass in the vertical direction and then again in the horizontal direction. The standard briquette weight is 5 kg and its dimensions are: 450 mm x 160 mm x 80 mm. The power required is 37 kW for 1800 kg/h of briquetting [7]. This technology can accept raw material with moisture content up to 22%. The process of oil hydraulics allows a speed of 7 cycles/minute (cpm) against 270 cpm for the die and punch process. The slowness of operation helps to reduce the wear rate of the parts. The ram moves approximately 270 times per minute in this process.

3.2 Screw press densification

The compaction ratio of screw presses ranges from 2.5:1 to 6:1 or even more. In this process, the biomass is extruded continuously by one or more screws through a taper die which is heated externally to reduce the friction [8]. Here also, due to the application of high pressures, the temperature rises fluidizing the lignin present in the biomass which acts as a binder. The outer surface of the briquettes obtained through this process is carbonized and has a hole in the centre which promotes better combustion. Standard size of the briquette is 60 mm diameter.

3.3 Roll press densification

In a briquetting roller press, the feedstock falls in between two rollers, rotating in opposite directions and is compacted into pillow-shaped briquettes. Briquetting biomass usually

requires a binder. This type of machine is used for briquetting carbonized biomass to produce charcoal briquettes.

3.4 Pelletizing

Pelletizing is closely related to briquetting except that it uses smaller dies (approximately 30 mm) so that the smaller products are called pellets. The pelletizer has a number of dies arranged as holes bored on a thick steel disk or ring and the material is forced into the dies by means of two or three rollers. The two main types of pellet presses are: flat/disk and ring types. Other types of pelletizing machines include the Punch press and the Cog-Wheel pelletizer. Pelletizers produce cylindrical briquettes between 5mm and 30mm in diameter and of variable length. They have good mechanical strength and combustion characteristics. Pellets are suitable as a fuel for industrial applications where automatic feeding is required. Typically pelletizers can produce up to 1000 kg of pellets per hour but initially require high capital investment and have high energy input requirements.

3.5 Manual Presses and Low pressure Briquetting

There are different types of manual presses used for briquetting biomass feed stocks. They are specifically designed for the purpose or adapted from existing implements used for other purposes. Manual clay brick making presses are a good example. They are used both for raw biomass feedstock or charcoal. The main advantages of low-pressure briquetting are low capital costs, low operating costs and low levels of skill required to operate the technology. Low-pressure techniques are particularly suitable for briquetting green plant waste such as coir or bagasse (sugar-cane residue). The wet material is shaped under low pressure in simple block presses or extrusion presses. The resulting briquette has a higher density than the original material but still requires drying before it can be used. The dried briquette has little mechanical strength and crumbles easily.. The use of a binder is imperative.

4. CHARACTERIZING PROPERTY OF THE BRIQUETTES

[1] Heating value: According to the ingredient ratio, the test was conducted to study the heating value. It was found that the heating value of briquettes obtained from this machine is approximately 5,200 calories per gram.

4.1 Comparison between the Existing and the New System

Comparison of the production results between the existing/traditional system (three individual machines working together and three workers) and the new system (a compact machine and a worker) at the same conditions such as using a 5 HP electrical motor and using screw-press technology.

Table. 2 Comparison between the existing and the new system

Sr.No.	Parameter	The Existing System	The New System
1	Worker required (man-day)	3	1
2	Productivity (Tonne /day)	0.58	0.72
3	Operating cost (Unit/Tonne)	3,554	2,782
4	Area required (m^2)	48	16

5. DESIGN AND CONSTRUCTIONAL DETAILS

The improved briquetting system consists of the following: a briquetting machine (of Bangladeshi design), a biomass pre-heater, a biomass-fired die-heating stove and a smoke removal system.

Fig 4. Biomass briquetting System

Fig 5. Improved briquetting machine with electric motor (Bangladesh)

5.1 Discussion of Taper die and System

In Biomass Briquetting Plant, A Taper Die or sleeve is used. it is a device to extract the finish biomass product through it. The briquetting press is a reciprocal crank type mechanical press with flywheel. One flywheel is driven by the main motor through continuous flat belt. Forced lubrication oil circulating system guaranties a long service life. The ground material is fed through a hopper by means of a screw conveyer with its own geared motor. The vertical screw pre compresses and forces the material downwards in to the feeding chamber. From the chamber the materials forced by the ram through a tapered die system on to the cooling track in the form of briquettes. Briquettes formed are cylinder shape. Which are pushed through cooling tracks under slight pressure for cooling and transport to packing point, where the briquettes are packed and ready for dispatch to local area or other place.

Fig 6:- A taper Die or Sleeve

6. ADVANTAGES OF BIOMASS BRIQUETTING

Briquettes produced from briquetting of biomass are fairly good substitute for coal, lignite, Firewood and offer numerous advantages.

- This is one of the alternative methods to save the consumption and dependency on fuel wood.
- Densities fuels are easy to handle, transport and store.
- They are uniform in size and quality.
- The process helps to solve the residual disposal problem.
- The process assists the reduction of fuel wood and deforestation.
- It provides additional income to farmers and creates jobs.
- Briquettes are cheaper than coal, oil or lignite once used cannot be replaced.
- There is no sulphur in briquettes.
- There is no fly ash when burning briquettes.
- Briquettes have a consistent quality, have high burning efficiency, and are ideally sized for complete combustion.

7. FACTORS AFFECTING DENSIFICATION/ BRIQUETTING

7.1 Disadvantages

- Tendency of briquettes to loosen when exposed to water or even high humidity weather.
- High investment cost and energy consumption input to the process

7.2 Factors Affecting Briquetting

7.2.1 Temperature and pressure

7.2.2. Moisture Content

8. DISCUSSION

Based on the knowledge and research about the briquetting machine for solidification of biomass and getting the knowledge about the various part of briquetting machine. The compact biomass briquetting machine fabricated for this research is a prototype unit. From comparison between the new and the existing/traditional briquetting system, it was found that when using the compact briquetting machine, the required production area, production time and operating cost are reduced.

These two machines use different processes to densify sawdust and agricultural waste, and the end products also have different densities and shape. The hydraulic press has not been used in India and is considered unsuitable for Indian raw materials. The most common raw materials for heated-die screw-press briquetting machines are saw dust and rice husk.

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BACILLUS THURINGIENSIS CRY1I AND CRY3A COLEOPTERAN-ACTIVE INSECTICIDAL CRYSTAL PROTEINS: HOMOLOGY-BASED 3D MODELLING AND IMPLICATIONS FOR TOXIN ACTIVITY

H.M.Mahadeva Swam

Division of Biotechnology, Indian Institute of Horticultural Research (IIHR), Bangalore, India

R.Asokan

Division of Biotechnology, Indian Institute of Horticultural Research (IIHR), Bangalore, India

Riaz Mahmood

Post-Graduate Department of Studies and Research in Biotechnology and Bioinformatics, Kuvempu University, Jnanasahayadri, Shankaraghatta, Shimog, Karnataka, INDIA

ABSTRACT

Determining the structure and function of a novel protein is a cornerstone of many aspects of modern biology. Three-dimensional (3D) models for the 79.2-kDa activated Cry1I and 77.4kDa activated Cry3A δ-endotoxins from Bacillus thuringiensis native isolates that are specifically toxic to Coleopteran insect pests were constructed by homology modeling. They were structurally similar to the known structures, both derived 3D models displayed a three domain organization: the N-terminal domain (I) is a seven helix bundle, while the middle and C-terminal of anti-parallel β-sheets. Significant structural differences within domain II in this model among all Cry protein structures indicates that it is involved in recognition and binding to cell surfaces. Comparison of Coleopteran-active cry toxins predicted structure with available experimentally determined Cry structures reveals identical folds. The collective knowledge of Cry toxin structures will lead to a more critical understanding of the structural basis for receptor binding and pore formation, And will allow to appreciate the scope of diversity .Taken together, these studies provided promising evidence that domain swapping, epitope-mapping and protein-engineering under the guidance of molecular modeling can serve as a rational and useful tool in understanding the mode of action of Cry toxins, and ultimately in producing better toxins. Structural insights from these molecular modeling studies would therefore increase our understanding of the mechanic aspects of these two closely related

Coleopteran-active insecticidal crystal proteins. These proteins are of interest for agriculture, as they offer a means for control of beetles and other insect crop pests.

Keywords: Bacillus thuringiensis, Coleopteran-active, δ-Endotoxin, Disulfide bond, Homology modeling, 3D model

INTRODUCTION

Currently the Cry δ-endotoxins have been shown to be highly active against a wide variety of insect larvae in the Diptera (mosquitoes and flies), Lepidoptera (moths and butterflies), Coleoptera (beetles and weevils), and Hymenoptera (wasps and bees) (Schnepf et al., 1998; de Maagd et al., 2001) orders. Insect pests that belong to the order Coleoptera are mainly tissue borers & other methods of management are generally ineffective. Their presences have been reported throughout the world and the magnitude of the problems they causes has been widespread over the past years. In general, the management strategy depends primarily on the use of highly poisonous poor graded chemical pesticides. The uses of bio-control agents in general and bacterial based Bacillus thuringiensis have been largely ignored. Applications towards non-lepidopteran insects are not as common as applications towards lepidopteran ones. Intensive screening programs are leading to a broader activity spectrum of toxins as the result of isolation and characterization of new strains with different combinations of crystal proteins, as well as the discovery of new toxins. δ-endotoxins are of great interest for development of new bioinsecticides and in the control of agriculturally important insect pests. Strains possessing novel cry1I genes have been evaluated as a source of new proteins with a broad host range (Shin et al., 1995; Song et al., 2003). Cry1I proteins were initially characterized by their dual activity towards Lepidoptera and Coleoptera (Tailor et al., 1992). The Cry3A toxin, produced by Bt var. tenebrionis (Krieg et al., 1983, Krieg et al., 1987) and other strains (Donovan et al., 1988, Lambert et al., 1992), is toxic to coleopteran species including the yellow mealworm, Tenebrio molitor (Krieg et al., 1983, Donovan et al., 1988), the Colorado potato beetle, Leptinotarsa decemlineata (Krieg et al., 1984, Lambert et al., 1992) and the cottonwood leaf beetle, Chrysomela scripta (Bauer 1990). The comparatively simple structure of the Cry3A toxin (Li et al., 1991), which is remarkably similar to Cry1Aa (Grochulski et al., 1995), makes it a useful model for exploring the structure and function relationship between ligand and receptor. The three-dimensional structure of the Cry toxins consists of three functional domains: (I) a cluster of seven K-helices predicted to be involved in membrane interaction (Li et al., 1991) ; (II) three antiparallel L-sheets involved in

receptor binding (Li et al., 1991, Grochulski et al., 1995, Wu et al., 1996); and (III) a L-sandwich implicated in receptor binding (Lee et al., 1995 & 1999, DeMaagd et al., 1996, Burton et al., 1999) and ion channel activity (Chen et al., 1993, Wolfersberger et al., 1996, Schwartz et al., 1997) in related Cry toxins.

Comparative or homology modelling can provide a useful three-dimensional (3D) model for a protein based on its aligning to one or more proteins of known structure. The prediction process consists of fold assignment, target–template alignment, model-building and evaluation of models. The number of protein sequences that can be modelled accurately is increasing steadily because of the growth in the number and variety of experimentally determined structures and because of improvements in the modelling software (Marti-Renom**,** 2003). Homology based modelling is the most reliable method to predict the 3D structure of a protein accuracy, experimentally determined structure. Even models with errors can be useful because some aspects of function can be predicted from coarse structural features (Marti-Renom**,** 2003). To gain molecular structural knowledge of the two closely related Bt Coleopteran-active insecticidal crystal proteins, Cry1I and Cry3A, we generated plausible 3D models of these two toxins by homology modeling. Implications for the molecular basis of proteolytic activation, membrane-pore formation, and specificity determination of these Coleopteran-active insecticidal crystal proteins are discussed.

MATERIALS AND METHODS

Nucleotide and deduced amino acid sequences were analyzed with the Blast tools (www.ncbi.nlm.nih.gov/BLAST). Signal peptide sequence was analyzed using SignalP 3.0 (http://www.cbs.dtu.dk/services/SignalP). Related sequences obtained from databases using the software GENSCAN online tool (www.genes.mit.edu/GENSCAN.html) were used for identification of gene features such as exon and splice sites in genomic DNA. BioEdit (version 7.0.4.1) was used for sequence editing and analysis. The 3D structures was predicted using phyre2 server (http://www.sbg.bio.ic.ac.uk/phyre2/), Conserved Domains and Protein Classification (http://www.ncbi.nlm.nih.gov/Structure/cdd/cdd.shtml, version CDDv2.32-40526 PSSMs) and the predicted structure was validated using protein structure validation software suite (PSVS) tool. Determination of protein functional analysis obtained from databases using InterProScan (http://www.ebi.ac.uk/Tools/pfa/iprscan/) and ProFunc (http://www.ebi.ac.uk/thornton-srv/databases/profunc/index.html).

RESULTS AND DISCUSSION

Crystal structures of the active toxins have been analyzed for Cry1Aa5, Cry2A protoxin6, Cry3A7, Cry3B8, Cry1Ac9, Cry4Ba10, and Cry4A11 by X-ray diffraction crystallography and Cry1Ab17, Cry11Bb12, Cry5Aa13 and Cry5Ba by homology modelling method. These reports have shown that the toxin has three structural domains. Domain I is an α-helical bundle made up of seven α helices. Domain II is comprised of antiparallel β sheets, and Domain III is made up of a β sandwich. Cry1 toxins have been extensively used in studies of Lepidopteran insect control and have attracted less attention to their coleopteran activity either alone or in combination. A complete understanding of 3D structures of all the coleopteran-active Cry family members is desirable for a comprehensive understanding of mechanisms underlying toxicity.

3D structure and functional prediction of Cry1I and Cry3A protein

The structure and function of a new Cry1I and Cry3A protein of native isolates of Bt is determined by using conserved domain database search service at the NCBI (http://www.ncbi.nlm.nih.gov/Structure/cdd/cdd.shtml) and the protein homology/analogy recognition engine (Phyre^2) computational tool (http://www.sbg.bio.ic.ac.uk/phyre2) fig. 1 and 2. These results show that the query protein sequence indeed belongs to Bt. Three dimensional (3D) structure is developed with a high confidence match (>90% confidence) and descriptors of the fold and superfamily of the template used. The overall fold of the model certainly correct and the central core of the model will be tending to be accurate. Consensus prediction score a confidence value for the secondary structure predicted (0=low confidence, 9=high confidence) whether regions of the query are structurally ordered (O) or disordered (d). Such disordered regions have often been found to be involved in protein function and should be taken into account when analyzing predicted functional sites. The practical applications of protein structure prediction are varied, including improving phasing signals in crystallography, selecting sites for mutagenesis and the rational design of hybrid toxins/domain swapping (Tuli et al., 1989). A better understanding of the 3-D structure of Cry1I and Cry3A will be helpful in designing domain swapping experiments to improve its insecticidal toxicity.

The reported structural models corresponds with residues 720 (Cry1I) and 645 (Cry3A) of the primary structure of CryV (X62821) and Cry3A (U10985). Alignment of Domain I was straightforward and the highly conserved nature of helix 5 in the Cry1Ib9 and Cry3A and Cry3A

toxin suggest the presence of other residues in this domain. Alignment of Domain II was also reliable. Domain III of the protein is quite well conserved at the N- and C-terminal sides. Domain I was composed of 267 (60–282) amino acid residues folded into a bundle of 9 amphipathic α-helices and two small (Data not shown). These features are highly conserved among the Cry toxins7 and have been proposed to be involved in 'pore formation' by analogy with the helical bundle pore forming structures of Colicin A toxin (Parker et al., 1989) and diphtheria toxin (Choe et al, 1992). Evidence from several studies has shown that the central helix (α5) is specifically involved in pore formation (Ahamad et al, 1990, Gazit et al, 1993, Wu et al, 1992). All the helices in the Cry1Ib9 model were similar to those in CryV. Helix α1 probably does not play an important role in toxin activity after the protoxin has been cleaved. It is possible that mutations proposed to increase the amphiphilicity in these helices could be involved in the improvement of pore forming activity of Cry1 type toxins. Cry3A domain I was composed of N-terminal 284 amino acid residues folded into a bundle of 9 amphipathic α-helices and two small -strands (Data not shown). As with other Cry toxins, Domain II of Cry1Ib9 and Cry3A consist of three Greek key β sheets arranged in β prism topology. It comprises residues 387–487, with one helix and 11 β strands in Cry1Ib9 and 12 β strands in Cry3A. Domain II consists of three anti-parallel β sheets, each ending at exposed loop regions. These loops are thought to participate in receptor binding and hence in determining the specificity of the toxin for attachment on different insect receptors. Domain III is composed of highly conserved residues 507–644 (with reference to Cry1Ib9) whereas scattered variation was observed in Cry3A (Fig 4).

The loops (β2-β3 and β4-β5) probably interact with the receptor through both hydrophobic and electrostatic interactions. This probably helps in receptor binding by providing more mobility to glycine and other similar residues that may interact through salt bridges with the receptor. Loop β4-β5 is mostly hydrophilic and the charged residues at the tip of the loop are probably important determinants for insect specificity. Aromatic amino acids within and adjoining the vicinity of apical loops 2 and 3 of Domain II have been postulated for protein-protein, protein-ligand interactions and have been reported to interact specifically with the outer envelope of the lipid membrane. It has been proposed that these residues interact with hydrophobic lipids tails. The exposed loop architecture has structural affinity to glycoprotein receptors of the target insect membrane. The absence of α12a and presence of additional α9b components in comparison with CryV. A few of the components α2b, α9a, β2, α10b, β3, β4, β5, β6, β7, β8, β9, β11, β17, β18 and β20 differ in locations (Cry1Ib9).

Whereas in the case of Cry3A the absence of β3, β24 and the presence of β12a components have been noticed. A few of the components α2a, α3, α4, α5, β1a, α6, α8a, α8b, β2, β4, β5, β6, β7, β8, β9, β10, β11, β12, β13a, β13b, β14, β15, β16, β17, β18, β19, β20, β21 and β23 differ in their positions. Like all the known Cry structures, the core and domain interfaces of both model molecules are built from sequence blocks that are highly conserved motifs of all Cry toxins (Höfte and Whiteley, 1989; Crickmore et al., 1998).

The recognition of artefacts and errors in experimental and theoretical structures remain a problem in the field of structure modelling. Web-based software tools like PROSA have a large database and are deployed for the validation of developed models (Wiederstien et al. 2007). The software evaluates the model by parsing its coordinates and energy using a distance-based pair potential (Sippl 1990, 1995) and capturing the solvent exposed protein residues (Sippl 1990, 1995). The results are displayed in form of a Z-score and a plot of residues energy. The Z-score shows overall model quality and provides deviations from the random conformation (Sippl 1993, 1995). The plot checks whether the Z-score of the protein is within the range of similar proteins (NMR and X-ray derived structures) as in Fig. 5. The value -8.53 (Cry1Ib9) close to the native conformation and the overall residues energy was largely negative. The Ramachandran plot showed that most of the model residues (84.2%) have φ and ψ angles in the core regions and 11.7% are in allowed regions, except for some proline and glycine residues (0.3%) that fall in the outlier region. The value -6.24 (Cry3A) is close to native conformation and the overall residues energy was largely negative. Number of residues in favoured region (~98.0% expected): 594 (92.5%; Number of residues in allowed region (~2.0% expected): 37 (5.8%; Number of residues in outlier region: 11 (1.7%). The results for most bond lengths, bond angles, and torsion angles were among the expected values for a naturally folded protein (Fig. 2).

CONCLUSION

Evidences presented here, based on the identification of structural equivalent residues of Cry1Ib9 and Cry3A toxin through homology modelling indicate that, they share a common tridimensional structure. Cry1Ib9 and Cry3A contain the most variable regions in the loops of domain II, which determine the toxin specificity. These are the first models of Coleopteran-active protein and its importance can be perceived since members of this group of toxins are potentially important candidates for pest control programs. These models will serve as a starting point for the design of

domain swapping and mutagenesis experiments aimed to the improvement of toxicity, and to provide a new tool for the elucidation of the action of mechanism of these Coleopteran-active proteins. The Cry toxin models constructed by us, will be valuable for protein engineering.

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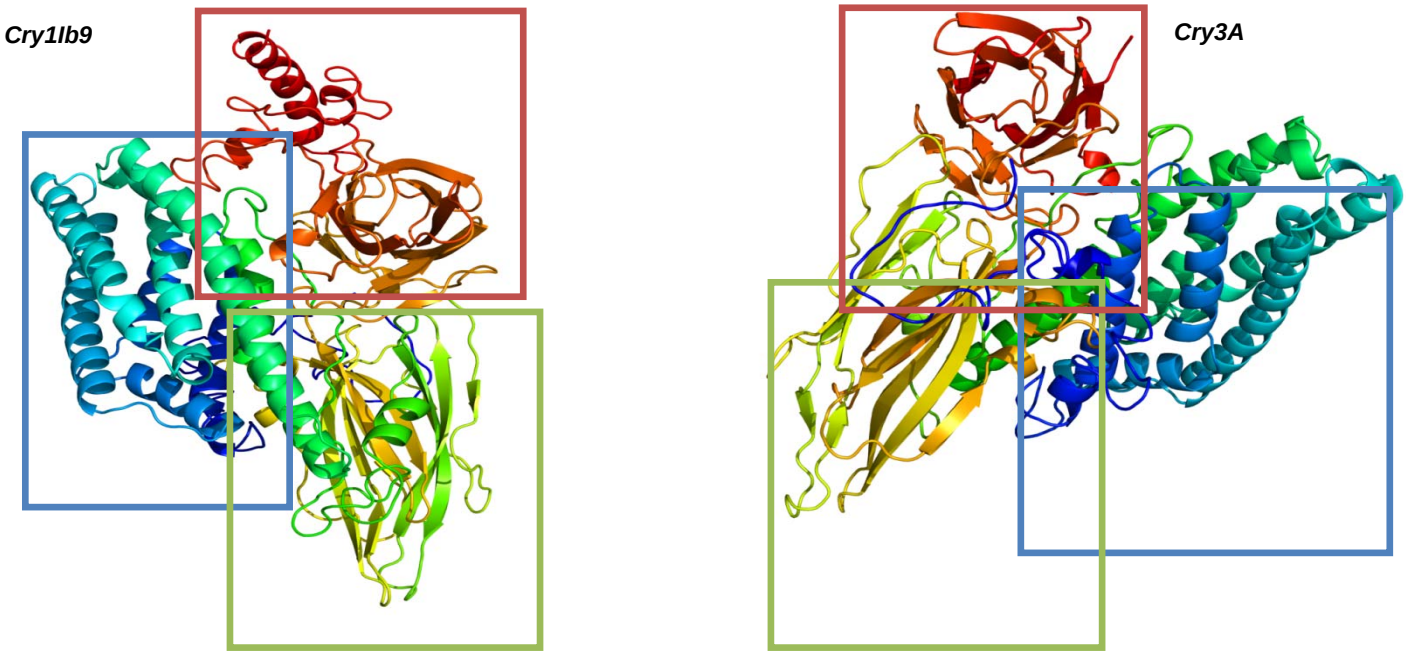

Fig. 1. Ribbon representation of the crystal structure of Cry1Ib9 and Cry3A toxins. The colored boxes denote the positions of the different domains.

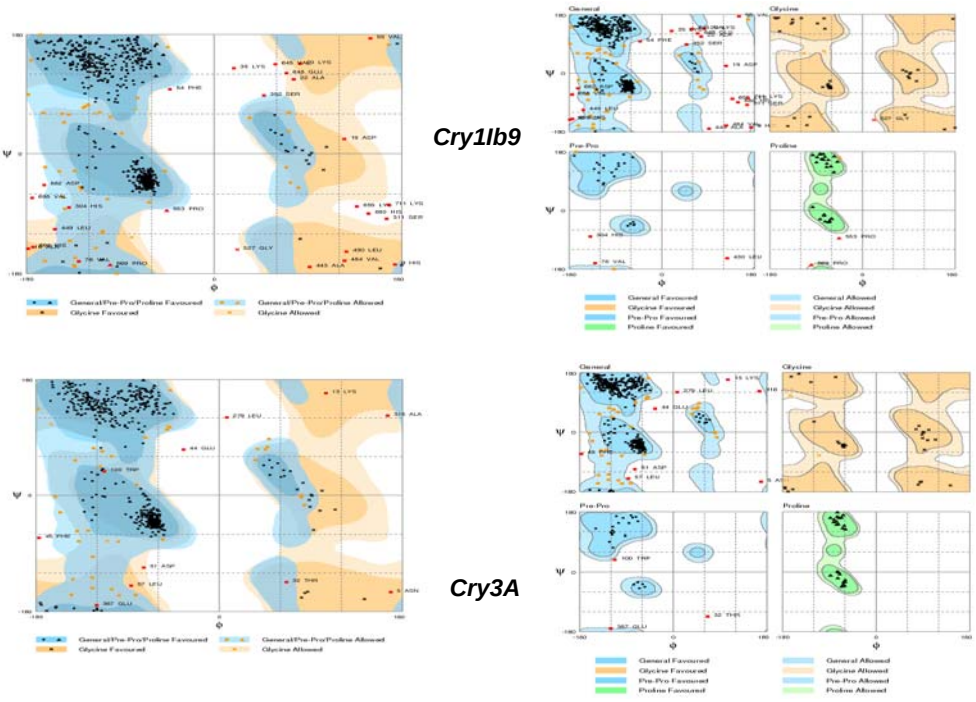

Fig. 2. Ramachandran plot analysis of the *Cry*1Ib9 and *Cry*3A toxin oligomer showing placement of residues in deduced model. The structure orientation residues are separately considered for angle and torsions. General plot statistics are: Number of residues in favoured region (~98.0% expected): 594 (92.5%; Number of residues in allowed region (~2.0% expected): 37 (5.8%; Number of residues in outlier region: 11 (1.7%).Other plots are evaluated for specific residues as showed at the top left corner of each plot.

FAILURE ANALYSIS OF BELT CONVEYOR SYSTEM BY PARETO CHART

Raghvendra Singh Gurjar

Department of Mechanical Engineering, MITS College Gwalior (M.P.) India

ABSTRACT

In this paper an analysis of the failure of 20 belt conveyors working in one of the coal thermal power plant. The mechanical, electrical, organizational and so called other failures were distinguished, and then using the Pareto-Lorenz diagram - a traditional quality management tool, the causes of each failure were found and on that grounds the actions were set out aimed at reducing the belt conveyors failure rate.

Keywords: *belt conveyors, failure, Pareto Lorenz Method*.

INTRODUCTION

Belt conveyor are the most common form of material handling system used in manufacturing, thermal power plant, mining industry and construction projects. Belt conveyor is constantly operating transporting equipment which is mainly used to convey mass bulk material like mineral, coal, sand, etc in powder or block as well as packed freight in metallurgy, mining, building heavy industries and transportation industry. Belt conveyor is the most perfect conveying equipment for coal handling, because it can work efficiently and continuously. Compared with other transporting equipment's, belt conveyor not only has the merits of long conveying distance, big capacity, constant working operation, but also with the features of operational reliability, easy to have automated and concentrated control. Belt conveyor has become the key equipment especially for high-output and high-efficiency coal handling plant.

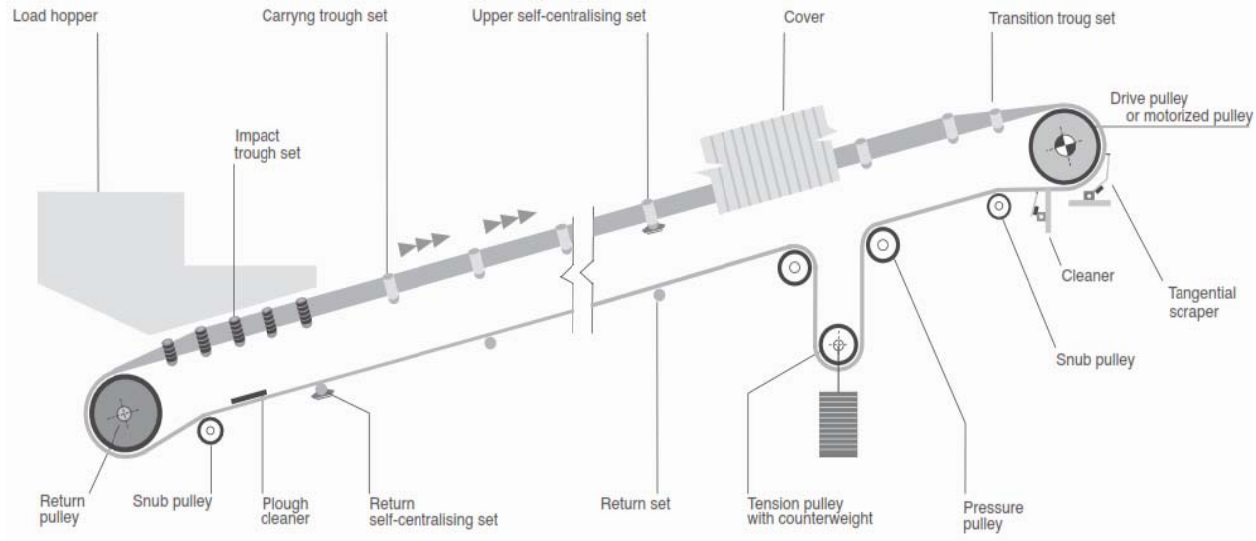

Figure 1 Simple Belt Conveyor

ANALYSIS OF BELT CONVEYORS FAILURE RATE

Analysis of failure rate of the belt conveyors operating in Parichha thermal power plant in the audited entity, was carried out based on daily reports collected by Executive Engg., Jr. Engg.and workers, during the period from December 2011 to May 2012, the report included the following replacing data:

- Date of failure,
- Duration of failure,
- Cause of failure,
- Place of failure.

During the research, in the Parichha thermal power plant to be analyzed 20 belt conveyors operated forming a coal transport system. 520 failures were recorded, which were divided by their type, number of failures of the type, duration and cause of failure. The belt conveyor's failures were divided into:

- Mechanical failures,
- Electrical failures,
- Other failures.

Here, also the difference between the damage and failure should be explained. The damage is a disability of machine that requires a repair without having to replace major assemblies [1]. While failure is a broad, serious damage, which spans many elements and assemblies [2]. The failure analysis of the selected belt conveyor system machinery shall be presented further in this paper. The failures occurring during operation of machines are divided into:

- Mechanical failures - caused by damages of the mechanical parts of the machine,
- Electrical failures - caused by damages of the electrical system components,
- Other - not associated with direct work of the machine, independent of man

To assess the failure of machinery the Pareto-Lorenz diagram was used, which belongs to the traditional quality management tools and allows clear, graphical arrangement of the factors affecting the examined phenomenon, and allows showing the relative and absolute distribution of errors, problems or their causes. The Pareto diagram can be easily read as to what is the biggest problem, what types of errors should be reduced to improve the production process [3]
Pareto-Lorenz diagram was constructed as a result of implementing the following steps [4, 5]:
1. Data regarding the downtimes due to failure of the tested machines operating in the analyzed wall was completed.
2. The data was assigned to specific machines, such as: longwall harvester, scraper conveyor and belt conveyors.
3. The cumulative percentages for each failure were calculated.
4. On the basis of the results the Pareto-Lorenz diagram was drawn up.
5. Interpretation of the drawn up diagram was conducted.

To calculate the cumulative percentage of individual failures the following formulas were used:

$$\mathrm{PIE_j} = \frac{100}{\mathrm{IE}}$$

$$\mathrm{SPIE_j} = \mathrm{PIE_j} + \mathrm{PIE_{j-1}}$$

$$\mathrm{PIA_j} = \frac{100.\,\mathrm{IA_j}}{\sum_{i=1}^{IE} \mathrm{IA_j}}$$

$$\mathrm{SPIA_j} = \mathrm{PIA_j} + \mathrm{PIA_{j-1}}$$

Where:

PIEj – percentage number of elements,

SPIEj – cumulative percentage number of elements,

IE – number of elements,

PIAj – percentage number of failures,

SPIAj – cumulative percentage number of failures,

IA – number of failures.

In addition to the causes of the failure, a very important factor is the time interval in which the individual failures occurred.

The following is a summary of the belt conveyor failure, due to all failure types.

Table1. The average failure of each failure of the belt conveyors

Cause of failure	**Total failure**	**Percentage of all failures**	**Cumulative percentage of all failures**
Mechanical	302	58.1	58.1
Electrical	113	21.7	79.8
Others	105	20.2	100

An analysis of the data contained in Table 1 shows that the largest failure was observed in the case of mechanical failure, which number of 302. The comparable failure was observed in case of electrical and others failures, which respectively numbers of 113 and 105.

Based on data contained in Table 1 the Pareto-Lorenz diagram was drawn up (Fig. 2) for the average failure of the belt conveyors.

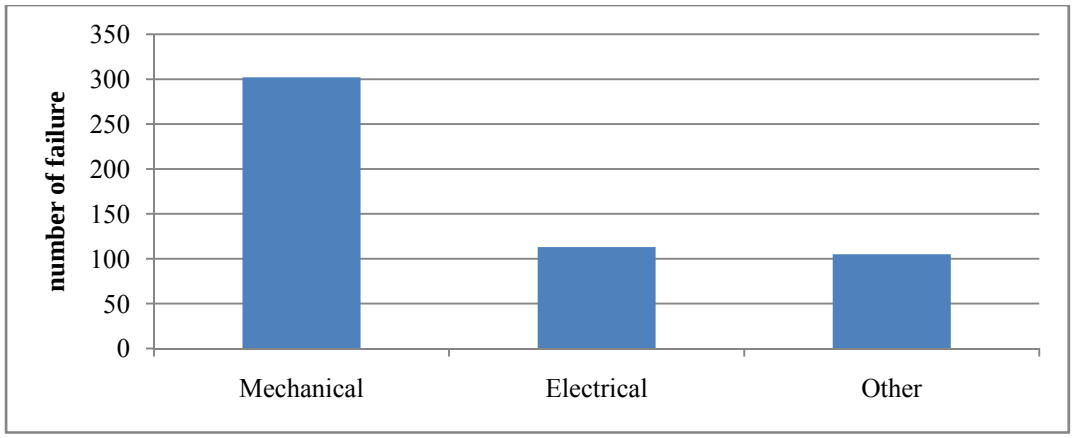

Figure 2 the Pareto-Lorenz diagram for the average duration of failure of the belt conveyors

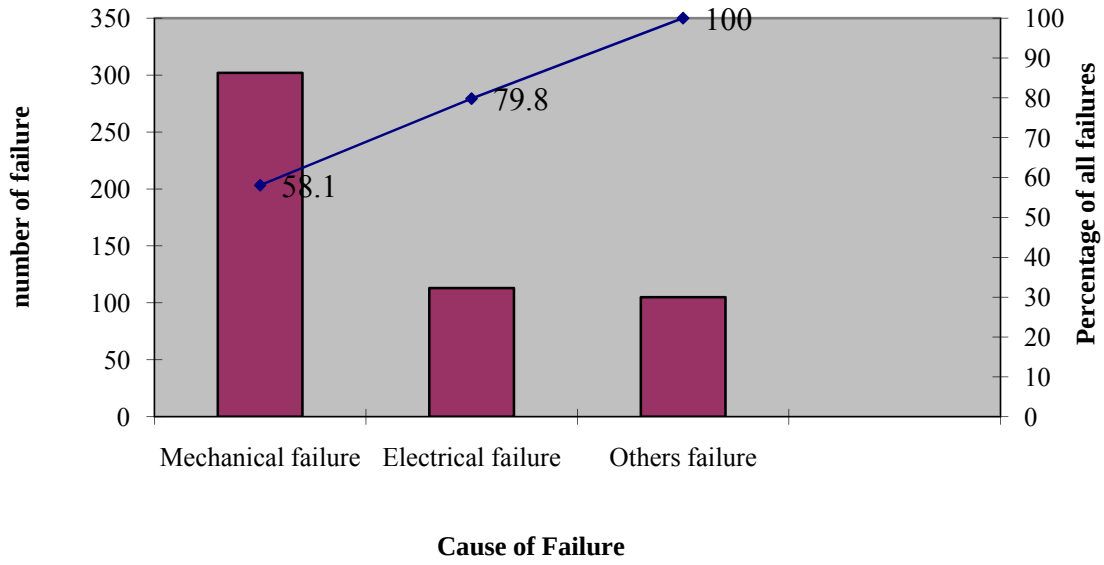

Figure 3 the Pareto-Lorenz diagram for all failures of the belt conveyors system

The Pareto-Lorenz diagram shows fig.3 that the largest failures of belt conveyors were the mechanical failures, which constitute 58.1% of all failures.

Electrical and other failures represent 41.9% of all failures of the belt conveyors operating in the tested wall of one of the coal handling thermal power plant.

MECHANICAL FAILURES

In the case of operation of the belt conveyors, 302 failures were reported caused by the mechanical factors. The summary of these factors is presented in Table No. 2

Tab. 2 causes of the mechanical failures of the belt conveyors

Cause of failure	Number of failure	Percentages of failure	Cumulative percentage of failure
Idler failure	117	38.7	38.7
Roller failure	107	35.4	74.1
Pulley bearing failure	19	6.3	80.4
Hammer failure	13	4.3	84.7
Coupling failure	11	3.6	88.3
belt damaged	9	3	91.3
Damaged of sealing	8	2.7	94
Gearbox failure	8	2.7	96.7
Damaged wiper	4	1.3	98
Pulley damaged	3	0.9	99.1
Clutch damage	3	0.9	100

When analyzing the data of Table 2 it can be concluded that the most common cause of the mechanical failure was the idlers damaged 117 failures and rollers damage 107 failures, pulley bearing damaged 19 failure, hammer 13 times damaged, coupling were damaged 11 times, belt 9 times fail and damage to sealing 8 times and gearbox 8 times damaged, wiper4 times, pulley and clutch are 3 times fail during the tested belt conveyors operation period.

Based on data from Table 2, the Pareto-Lorenz diagram was drawn up (Fig. 4) for the mechanical failures of the belt conveyors.

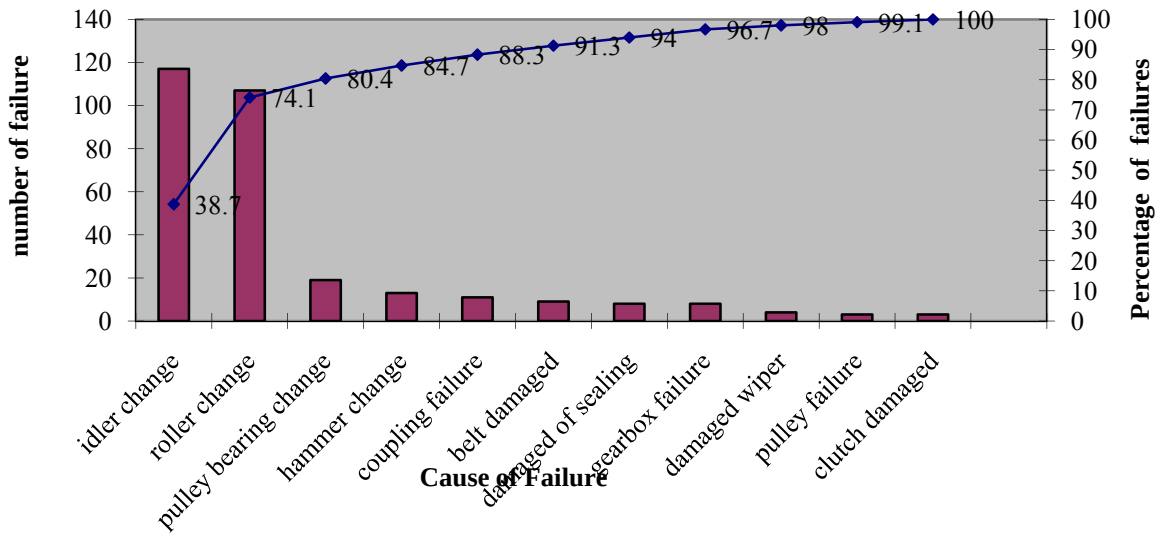

Figure 4 the Pareto-Lorenz diagram for the mechanical failure of the belt conveyors

Failure idlers photo

Failure roller photo

Belt repair work photo

Wiper or scrapper photo

ELECTRICAL FAILURES

The largest group among the failures is the electric failures of the belt conveyors, which were recorded 113 times during the tested period. In Table 3 the causes leading to electrical failure are summarized.

Tab. 3 causes of the electric failure of the belt conveyors

Cause of failure	**Number of failure**	**Percentage of failure**	**Cumulative percentages of failure**
Faulty electric conveyors	102	90.3	90.3
Lack of control	8	7	97.3
Faulty temperature sensor	3	2.7	100

The analysis of data from Table 3 shows that 102 failures were caused by causes that in the reports were classified into the following category: electrically inefficient conveyors. This is a very general category, and therefore cannot accurately determine what the cause of the individual failures was.

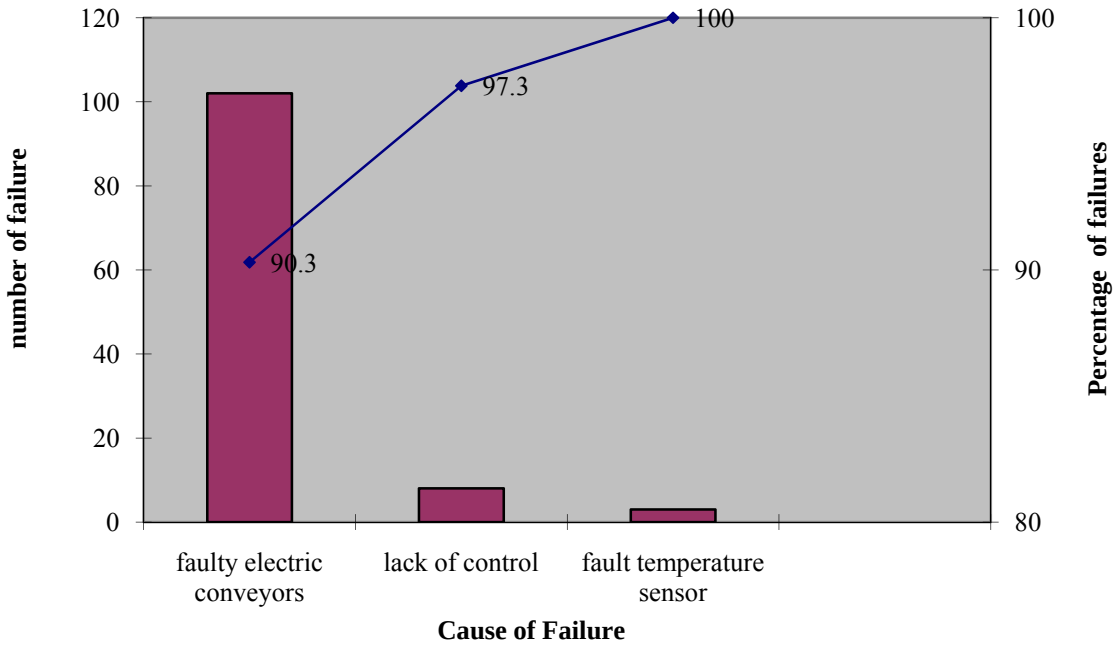

Figure 5 the Pareto-Lorenz diagram for the electrical breakdown of the belt conveyors

On the basis of data included in Table 3 the Pareto-Lorenz diagram was drawn up (Fig. 5) for the electric failures of the belt conveyors. The diagram shows that 90.3% of the causes of failure are classified as: electrically inefficient conveyors. Causes as lack of control and faulty temperature sensor represent only 9.7% of all the electrical conveyor failures.

OTHERS FAILURES

Other failures recorded 105 times during the testing period, they form the third group in terms of number of their occurrence. The causes of the other failures of the belt conveyors are contained in Table 4.

Tab. 4 causes of the other failures of the belt conveyor

Cause of failure	Number of failure	Percentages of failure	Cumulative percentage of failure
Jam of the conveyor	22	20.9	20.9

No current	21	20	40.9
Greasing	15	14.3	55.2
Service oil fill up	12	11.4	66.6
Belt adjustment	11	10.5	77.1
Welding work	11	10.5	87.6
Rewound belt	7	6.7	94.3
Nut & bolt tight	4	3.8	98.1
Gear box alignment	2	1.9	100

Based on the analysis of data from Table 4 it can be stated that the biggest failure of the group others was caused by the jam of the conveyor 22 times. No current were 21 times, in the lack of greasing of the reason of failure of belt conveyor 15 times. Belt adjusts and welding work was 11 times failure, the rewound belt problems of 7 times, nut and bolt tight 4 times and gear box alignment 2 times.

Based on data from Table 4 the Pareto-Lorenz diagram was drawn up (Fig. 6) for the other failures of the belt conveyors.

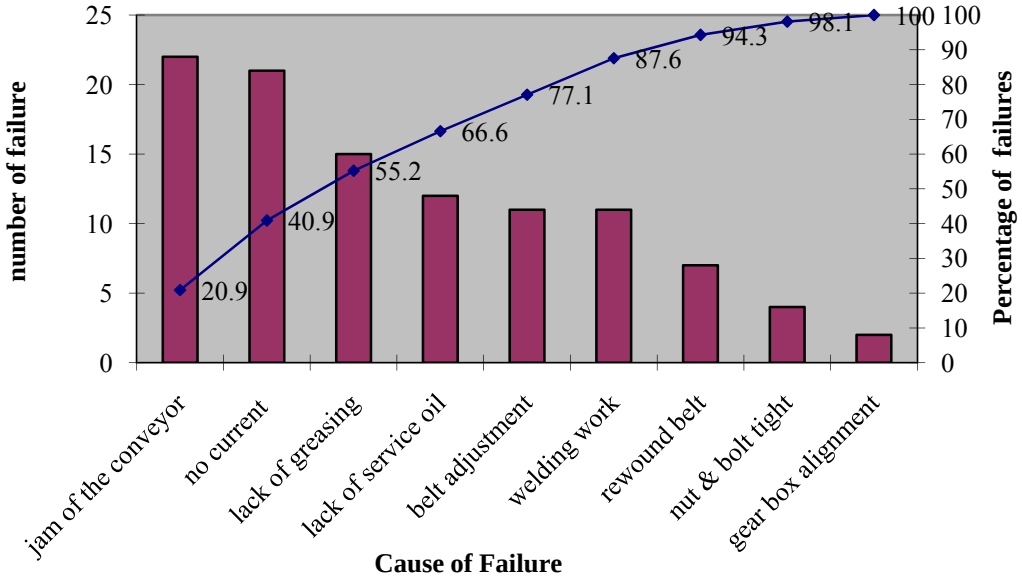

Figure 6 the Pareto-Lorenz diagram for the other failures of the belt conveyors

Belt joint

Pulley damaged by coating

According to the Pareto-Lorenz diagram it can be concluded that the jam of the belt, lack of electricity, greasing, servicing and adjustment of the belt represent 77.1% of the reasons causing the other failure of the operating conveyors in the analyzed tested wall of the test. The remaining four reasons are 22.9% of all other failures of the belt conveyors.

CONCLUSION

Based on the analysis of failure of the belt conveyors, it can be concluded that:

- In the period from December 2011 to May 2012 there were 504 failures of 20 belt conveyors operating in Parichha thermal power plant in Jhansi,

- The largest groups are the mechanical failures 302 reported, followed by the electric failures 113 reported, followed by the so-called other failures 105 reported.

In order to reduce potential failures of the belt conveyor, the following appropriate action should be taken:

- Increase of monitoring and control of the belt conveyor in operation through the creation of an appropriate maintenance schedule, maintenance and inspection of machinery, with particular emphasis on their critical elements,
- Establishing appropriate procedures for the maintenance of individual machines, and control of their execution with the use of checklists,

- Development of an appropriate database on the number and causes of failures of the belt conveyor
- Application of reliability theory, which will allow to design a repair database and develop of the maintenance schedules, which will extend the time of trouble-free operation of machines,
- Modifying of the elements of design solutions that mostly are subjected to the failures, due to the use of detailed data about the causes and the number of failures contained in databases,
- Conducting periodic diagnostic measurements, ensuring proper control of individual units of machinery and it will increase the reliability and durability of these machines,
- Appointment and training of the relevant departments responsible for a trouble-free process of the coal handling.

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A MIDDLEWARE TECHNOLOGY FRAMEWORK FOR DATA MANAGEMENT AND DISTRIBUTION IN GRID COMPUTING

P.Nagamani

Research Scholar, Rayalaseema University, A.P. India.

Y. Ramadevi

Professor of CSE, CBIT, A.P. India.

D. Vasumathi

Associate Professor, CSE, JNTUH CEH, A.P. India.

ABSTRACT

The goal of this framework is to provide good resource allocation for grid application and support collaboration with consistency or transparency over field test on distributed data. By using a computational grid facility to schedule testing jobs on different hosts, the framework offers high flexibility and scalability, thus enabling computationally intensive tests and some kinds of distributed tests, such as portability tests and field tests, which otherwise would be difficult to automate. These grid frameworks with Open grid Services Architecture (OGSA) & GT4 has main characteristics providing middleware technologies along with distributed computing.

Keywords: Grid computing, middleware Framework, Data Management, Data Distribution.

1. INTRODUCTION

The Grid computing discipline involves the actual networking services and connections of a potentially unlimited number of ubiquitous computing devices within a "grid"[1].Grid Computing is widely regarded as a technology of immense potential in both industry and academia. The evolution pattern of grid technologies is very similar to the growth and evolution of internet. The Grid architecture is shown in Figure 1 below. [1].

Figure .1 Grid Architecture

Abbas introduces the Open Grid Services Architecture, a common framework for building grids across the enterprise and beyond. Technical professionals will learn how to use OGSA to create grid services and how (and when) to grid-enables existing software from networking to life sciences, and from telecommunications to R&D and financial industry, specific area experts describe grids' multifaceted uses.

(b) Data movement requires secure data transfers, thus virtualized data storage mechanisms such as Storage Area Networks(SAN), network file systems, storage servers and virtual databases evolved that help developers to design such infrastructure with much more flexibility. Data-intensive grids is on data management of variety of data storage facilities in geographically dispersed locations capable of providing data virtualization services to provide transparency for data access, integration and processing. By expressing the high-level structure of a workload, an abstraction like All-pairs can be used to improve the usability, performance and efficiency of a campus grid[5].

2. APPLICATIONS OF MIDDLEWARE TECHNOLOGIES

A learning Assessment Grid is built as LA grid on the basis of these middleware technology grids. Service oriented grid middleware layer provides a good middleware platform or collaborative application in large-scale cross-organization environment. The major Grid tools and application projects making use of Grid bus components within their middleware include ephysics portal, Virtual observatory, Analysis data Grid ,Global data intensive Grid collaborative, NeuroGrid, Natural language of Engineering on the Grid, HydroGrid, Amsterdam private Grid. By using a computational grid facility to schedule testing jobs on different hosts,

the framework offers high flexibility and scalability, thus enabling computationally intensive tests and automation[3].

Grid Data Management

When considering data management, the main requirements of a Grid are:

- ***Data transparency and consistency***
- ***Autonomy support***
- ***Resource discovery***.
- ***Query expressiveness***
- ***Efficiency***
- ***Quality of service***
- ***Fault-tolerance***
- ***Workflow support***
- ***Autonomic management***
- ***Security***

3. LITERATURE SURVEY

3.1. *The Open Grid Services Architecture (OGSA)*

The Open Grid Services Architecture (OGSA) describes architecture for a service-oriented grid computing environment for business and scientific use, developed within the Global Grid Forum (GGF). OGSA is based on several other Web service technologies, notably WSDL and SOAP, but it aims to be largely agnostic in relation to the transport-level handling of data[8].

Briefly, OGSA is a distributed interaction and computing architecture based around services, assuring interoperability on heterogeneous systems so that different types of resources can communicate and share information. OGSA has been described as a refinement of the emerging Web Services architecture, specifically designed to support Grid requirements. OGSA has been adopted as grid architecture by a number of grid projects including the Globus Alliance. Conceptually, OGSA was first suggested in a seminal paper by Ian Foster called "The Physiology of the Grid", and later developed by GGF working groups which resulted in a GGF information document, entitled The Open Grid Services Architecture, Version 1.5. The Global Grid Forum continues to track Tier 1 use case scenarios used in the definition of the OGSA core services.

The main solutions for Grid data management, in the context of computational Grids are file-based. A basic solution, used in Globus, is to combine global directory Services to locate files and a secured file transfer protocol such as GridFTP. Although simple, this solution does not provide distribution transparency as it requires the application to explicitly transfer files. However, high-level data management services can be provided on top of GridFTP, e.g. the Stork data placement scheduler in the Condor project Another solution is to use distributed file systems for the Grid, e.g. GridNFS , which provide location-independent file access. The Grid Application Development Software(GrADS) have demonstrated the complexity of writing applications for the Grid and managing their execution where that *revolves around the idea that a program mus*t be configurable to run on the Grid[9].Recent solutions have also recognized the need for high-level data access and extended the distributed database architecture whereby clients send database inria-00473481, version 1 - 15 Apr 2010 requests to a Grid server (with a directory) that forwards them transparently to the appropriate database servers. These solutions rely on some form of global directory management, where directories can be distributed and replicated. However, current solutions focus on data sharing and collaboration for statically defined virtual organizations with powerful servers. They cannot be easily extended to satisfy the needs of dynamic virtual organizations such as professional communities where members contribute their own data sources, perhaps small but in high numbers, and may join and leave the Grid at will. In particular, current solutions require heavy Organization, administration and tuning which are not appropriate for large numbers of small devices.

3.2 Architecture Related Issues, In fracture Related Issues And Management Relate Issues:

Architecture related issues are concerned about the overall architecture of the grid system like the concerns pertaining to information security , concerns about user and resource authorization, issue pertaining to the overall service offered by the grid system. The infracture related issues are concern about the underlying infrastructure, which includes the hosts or the machines, and the network infrastructure, in addition, several management systems need to be in place for an all-pervasive enterprise level and secure grid system. There are three main types of management systems which are important from the grid perspective, namely the credential management system,the trust management system and the monitoring system. All the three issues are dealt with in research work along with existing solutions and potential concerns.In plan supported

collaborative Grid framework , the three levels of activities from coordinating acitivity, cooperating activity and coconstructive activity gives basic ideas of management and monitoring systems of Grid[4].

- Globus, Legion, Condor and condor-G, UNICORE uses framework with web services and OGSA.
- A computational grid is defined as hardware and software infracture that provides dependable, consistent, pervasive, and inexpensive access to high-end computational capabilities.
- The latest Globus Toolkit(GT3) is a java implementation of the OGSI specification. Sandholm et al. implement OGSI for the java virtual machine runtime GT4 introduces a powerful and flexible authorization framework. The GT4 java Web service runtime invokes a series of message interceptors to process each message when it is first received. The latest version GT4 includes software components and libraries for resource management, data movement, resource access, resource discovery, security management etc[4].
- Computing clouds provide a useful basis for improving current Grid developments (current examples include the Nimbus project, which utilizes Globus Toolkit4.)For, instance, the requirement of fault tolerance and resilience can be achieved by automatically deploying more instances of a resource or service image.
- GRAM provides resource allocation, process creation, monitoring and management services. GRAM simplifies the uses of remote systems by providing a single standard interface for requesting and using remote system resources fir the execution.
- GSI provides a single-sign-on, run anywhere authentication service with support for local control over access rights and mapping from global to local user identities.
- Legion a middle ware project whose goal is to promote the principled design of distributed system software by providing standard object representations for processors, data systems, file systems, and so on.
- Condor is a tool for harnessing the capacity of idle workstations for computational tasks. Condor is well suited for parameter studies and high throughput computing, where jobs generally do not need to communicate with each other. Condor is capable of queuing hundreds of thousands of jobs reliably and scheduling performance[5].

3.3 Objectives

The main objective of this architecture is to provide a high level grid framework for wide range of collaborative applications. The required characteristic of this framework major related to

- Transparency of data that allows data management or distribution data
- Collaborative design grid bases mostly on OGSA implemented Grid `services on Globus Toolkit 4 with middleware technologies.

According survey literature The components available for data management fall into two basic categories -Data movement & Data replication.

Data movement: There are two components related to data movement in Globus toookit:the Globus GridFTP tools and the Globus Reliable File Transfer (ret) service.

GridFTP is a protocol defined by Global Grid Forum Recommendation GFD.020, RFC959, RFC2228 and a draft before the IETF FTP working group. The Grid FTP protocol provides for the secure, robust fast and efficient transfer of data.

4. IMPLEMENTATIONS AND VALIDATIONS

Even though the technology faces several significant challenges, many vendors and industry observers predict a bright future for cloud computing. The Cloud Computing architecture is shown in Figure 2 below. [14]

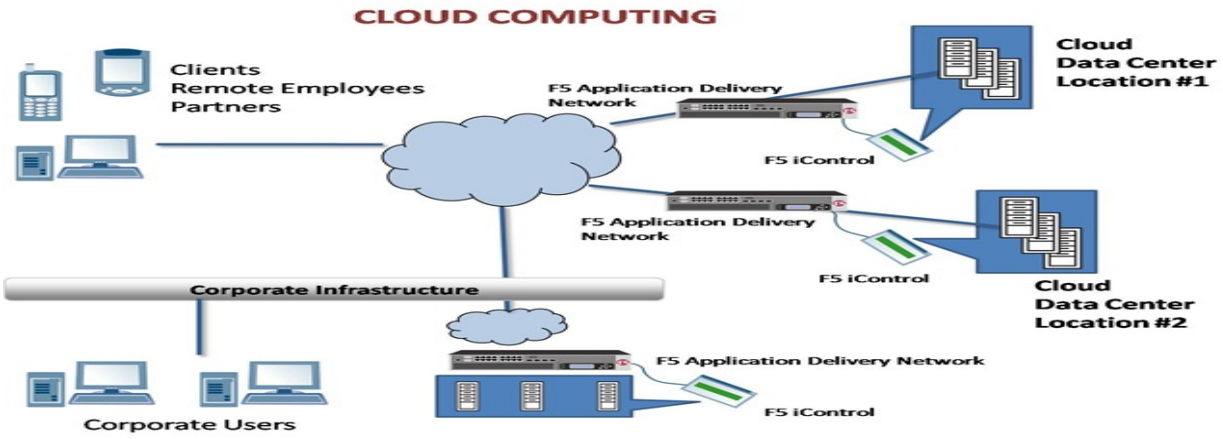

Figure 2. Ensuring data storage security in cloud

Cloud computing (as an extension to web services) has been envisioned as the next-generation architecture of IT enterprise. In contrast to traditional solutions, where the IT services are under

proper physical, logical and personnel controls, cloud computing moves the application software and databases to the large data centers, where the management of the data and services may not be fully trustworthy. This unique attribute, however, poses many new security challenges which have not been well understood. In this article, we focus on cloud data storage security, which has always been an important aspect of quality of service. To ensure the correctness of users' data in the cloud, we propose an effective and flexible distributed scheme with two salient features, opposing to its predecessors. By utilizing the homomorphic token with distributed verification of erasure-coded data, our scheme achieves the integration of storage correctness insurance and data error localization, i.e., the identification of misbehaving server (s). Unlike most prior works, the new scheme further supports secure and efficient dynamic operations on data blocks, including: data update, delete and append. Extensive security and performance analysis shows that the proposed scheme is highly efficient and resilient against Byzantine failure, malicious data modification attack, and even server colluding attacks .cloud computing proponents say a system run at a large service provider that has many resources and redundant equipment should offer more availability than an infrastructure run in-house by a small or even midsize company[14].

Existing System: From the perspective of data security, which has always been an important aspect of quality of service, Cloud Computing inevitably poses new challenging security threats for number of reasons.

1 . Firstly, traditional cryptographic primitives for the purpose of data security protection can not be directly adopted due to the users' loss control of data under Cloud Computing. Therefore, verification of correct data storage in the cloud must be conducted without explicit knowledge of the whole data. Considering various kinds of data for each user stored in the cloud and the demand of long term continuous assurance of their data safety, the problem of verifying correctness of data storage in the cloud becomes even more challenging.

2 . Secondly, Cloud Computing is not just a third party data warehouse. The data stored in the cloud may be frequently updated by the users, including insertion, deletion, modification, appending, reordering, etc. To ensure storage correctness under dynamic data update is hence of paramount importance.

These techniques, while can be useful to ensure the storage correctness without having users possessing data, can not address all the security threats in cloud data storage, since they are all focusing on single server scenario and most of them do not consider dynamic data operations. As an complementary approach, researchers have also proposed distributed protocols for ensuring storage correctness across multiple servers or peers. Again, none of these distributed schemes is aware of dynamic data operations[15]. As a result, their applicability in cloud data storage can be drastically limited.

Proposed System: In this implementation, we propose an effective and flexible distributed scheme with explicit dynamic data support to ensure the correctness of users' data in the cloud. We rely on erasure correcting code in the file distribution preparation to provide redundancies and guarantee the data dependability. This construction drastically reduces the communication and storage overhead as compared to the traditional replication-based file distribution techniques. By utilizing the homomorphic token with distributed verification of erasure-coded data, our scheme achieves the storage correctness insurance as well as data error localization: whenever data corruption has been detected during the storage correctness verification, our scheme can almost guarantee the simultaneous localization of data errors, i.e., the identification of the misbehaving server(s).

1. Compared to many of its predecessors, which only provide binary results about the storage state across the distributed servers, the challenge-response protocol in our work further provides the localization of data error.
2. Unlike most prior works for ensuring remote data integrity, the new scheme supports secure and efficient dynamic operations on data blocks, including: update, delete and append.
3. Extensive security and performance analysis shows that the proposed scheme is highly efficient and resilient against Byzantine failure, malicious data modification attack, and even server colluding attacks.

The application architecture is provided in Figure 3 below. The execution screen shot of this application is provided in Figure 4 below.

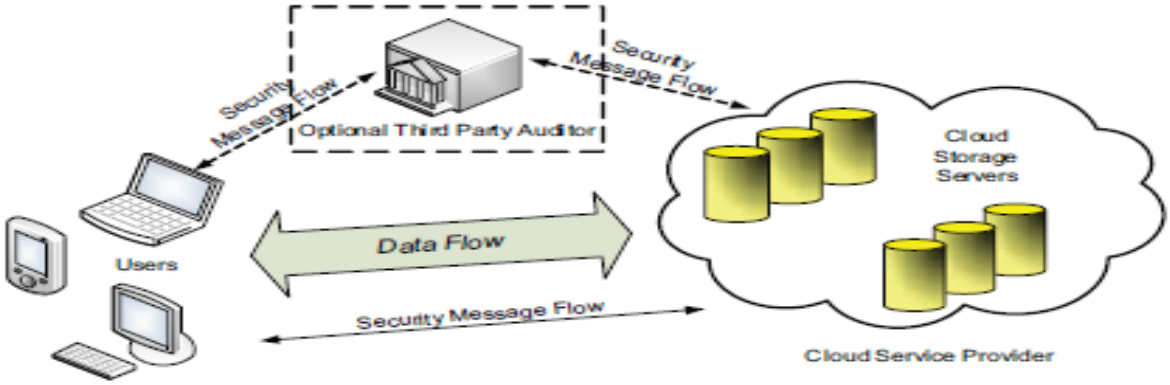

Figure 3 Security Architecture of the case study application

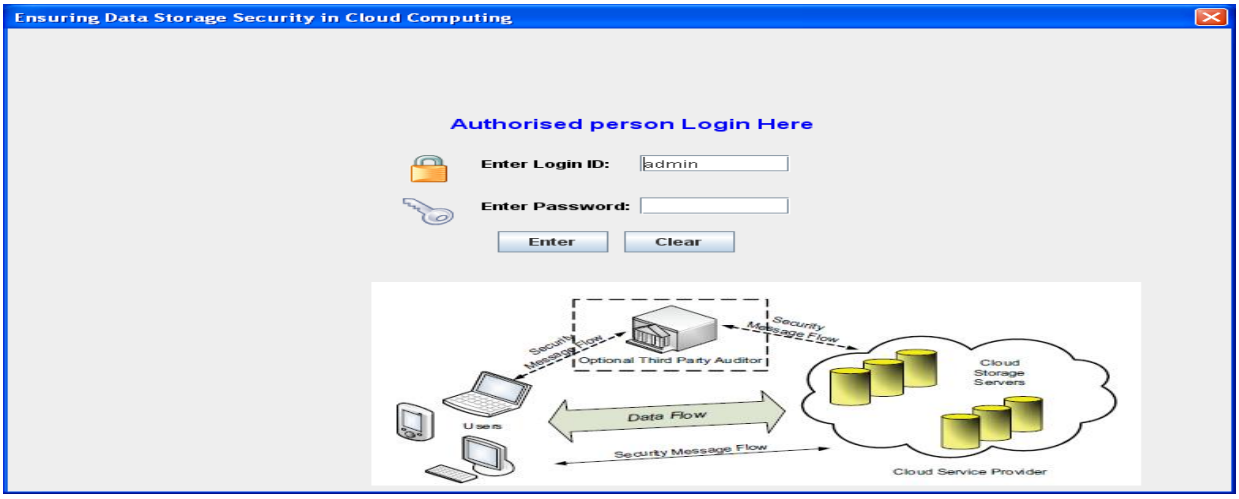

Fig. 4. Execution screen shot of the application

5. CONCLUSIONS

In this paper we proposed a middleware technology framework for data management and distribution in grid computing. The goal of this framework is to provide good resource allocation for grid application and support collaboration with consistency or transparency over field test on distributed data which automates. These grid frameworks with Open grid Services Architecture (OGSA) & GT4 has main characteristics providing middleware technologies along with

distributed computing. The data distribution or resource distribution have effective grid collaboration framework.

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A VIRTUAL SEMANTIC WEB BASED TECHNOLOGY: AN ASSIMILATION WITH ENHANCED LEARNING & GRADING

Sudeshna Chakraborty

Asssistant Professor, lingaya's University

Vivek Kumar

Principal DCTM, NCR

ABSTRACT

Enhanced learning is a process in which we use the electronic standard to acquire the defined set of relevance and processes. With its increasing identification and recognition in medical and corporate world, a unique model or framework is required[2]. Research works in the field of bio-technology, astronomical sciences are represented by a wide range of applications, ranged from virtual classrooms to remote courses or distance learning. Auto grading for content has been considered as main meeting point for discovering areas to asset learning process outcome. Moreover auto grading for content is very important to help the teacher and academic staff to expedite their works in grading the quiz or examination answer[5]. The content answer must be consistent and low computational time and cost. However, content is very hard to be checked due to it's consistent high subjectivity during the review process. The necessity on automated scoring for content is grown together with the improvement of technology in E-learning system. In short, the involvement of semantic web is required in order to solve the variation of data. Learning management system (LMSes) is a computer application that can be used as tools to support teaching activities[7]. Recently a lot of open source E-Learning applications are produced and has been used widely in academic institutions study about how to make automatic marking for ESL content. The process of computer analysis of input provided in a human language (text/speech) is known as Natural Language Processing[3]. This project proposes a new technique to increase the accuracy and performance of E-learning system using Natural Language Processing. However, studies show that still it demands more effective approach.. The main paradigm of this paper is that it will accumulate the information from academia-industry amalgamation for the implementation of my proposed models & surveys ,important aspects of

Web Intelligence (WI) in the context of Enhanced learning and advanced Information Technology (IT) on the next generation of Web-related products, systems, services, and activities. As a direction for scientific research and development, WI can be extremely beneficial for the field ontology-based Enriched instructional management system. Index Terms- Auto Grading of Content, Enhanced learning, Natural Language Processing, Web Intelligence, semantic

INTRODUCTION

The big question for many researchers in the area of educational systems now is what is the next step in the evolution of e-learning? Are we finally moving from a scattered intelligence to a coherent space of collaborative intelligent content grading? There are several computerized content-scoring systems: (1) Project Content Grade (PEG), (2) Latent Semantic Analysis (LSA), (3) Electronic Content Rater (e-rater), (4) Bayesian Content Test Scoring system BETSY),and others[10].This research discusses how these different scoring methods work, where they are currently implemented, ELG in Indian context (Asian also), Solution for machine translated content and difficulties that have been knowledgeable in their development and implementation. The idea is to utilize different statistical techniques, including linear regression models and factor analysis. Further improvements could be made when considering clusters and exchanges of these features. These content grading and classification systems could also be extended for use in the generation of writing diagnostics and instructional feedback[6]. How close we are to the vision of the Educational Semantic Web and what do we need to do in order to realize it? Two main challenges can be seen in this direction: on the one hand, to achieve interoperability among various educational systems and on the other hand, to have automated, structured and unified authoring support for their creation by capturing the mental status of the students in learning. Only 80% success is achieved in machine rated contents.

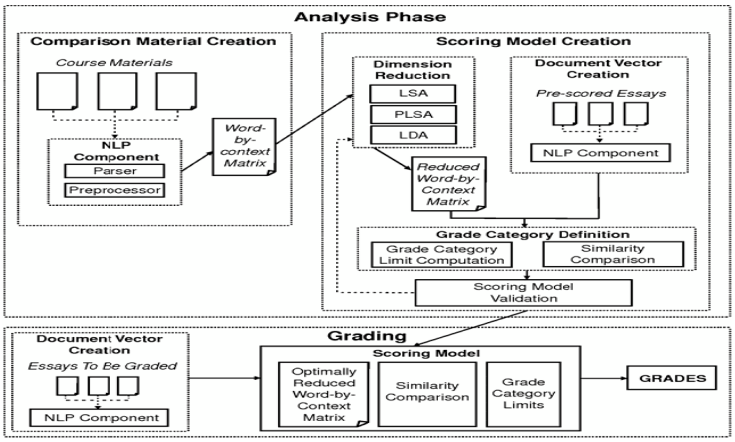

FIG 1: The Architecture of AEG

There are three main components at the implementation level. These are NLP, the grade definition, and the dimension reduction components .The NLP component consists of a syntactic parser and preprocessor[6]. We used the NLP component for two distinct tasks: firstly, to create a word-by-context matrix (WCM) representing the course materials, and, secondly, to build document vectors of the pre-scored essays and essays to be graded. Pre-scored essays in this context refer to those essays that have been given a grade by the teacher and that are used for calibrating the AEG before the actual grading. Because WCM contains the number of occurrences of each word in each context in the course materials (i.e. document contexts, the paragraph contexts, or the sentence contexts), it is indeed a collection of document vectors from all possible contexts.

REVIEW OF LITERATURE

Recently, several researchers studied the issue of Web based application distinguished three basic levels in the same : the Web character of the program, the pedagogical background, and the personalized management of the learning material[4]. They defined a web-based program as an information system that contains a Web server, a network, a communication protocol like HTTP, and a browser in which data supplied by users act on the system's status and cause changes. The pedagogical background means the educational model that is used in combination with pedagogical goals set by the instructor. The personalized management of the learning materials means the set of rules and mechanisms that are used to select learning materials based on the student's characteristics, the educational objectives, the teaching model, and the available media [1]. Existing Models are language specific (I.e. only ELG for English is the most popular

systems).Many works have combined and integrated these Many works have combined and integrated these three factors in e-learning systems, leading to several standardization projects. Some projects have focused on determining the standard architecture and format for learning environments, such as IEEE Learning Technology Systems Architecture (LTSC), Instructional Management Systems (IMS), and Sharable Content Object Reference Model (SCORM). IMS and SCORM define and deliver XML-based interoperable specifications for exchanging and sequencing learning contents, i.e., learning objects, among many heterogeneous e-learning systems[3].

Furthermore, some of semantic relationships among the educational contents, such as 'equivalent', 'inverse', 'similar', 'aggregate' and 'classified', can offer important and useful information for the intelligent e-learning system. For this purpose, an ontology is introduced in our model.

It can play a crucial role in enabling there presentation, processing, sharing and reuse of knowledge among applications in modern web-based e-learning systems because it specifies the conceptualization of a specific domain in terms of concepts, attributes, and relationships. Moreover, the number of ontology-centered researches has increased dramatically because popular ontological E-Learning Model Based On Semantic Web Technology 65 languages are based on Web technology standards, such as XML and RDF(S), so as to share and reuse it in any web-based knowledge system[5] .

PROPOSED MODEL

In the following subsections, based on the Semantic Web technology and e-learning standards, we describe our proposed e-learning model, illustrated in Figure .The Web-based Services: Our model in Figure 2, provides the student with two kinds of contents, less on learning content and more on Assessment content. Each content has different types of services such as: Learning services: provide registration, online course, interactive tutorial, course documents ,announcements (displays information to the students that the instructors of the course want him to know),links (displays a list of useful URL links that have been identified by the course instructors), student papers (students can post/upload requests files to the instructor), and Semantic search (helps the student to search for resources). Assessment services: provide exercises, assignments and quizzes for evaluation of the student knowledge[4].

During the learning process, a dynamic selection presentation of both contents will be accomplished. On the other hand, our enhanced learning system allows instructors to create his course websites through a browser, and monitoring the students performance, they have many services and tools such as: publish documents in any format (Word, PDF, Video, .) to the students, manage a list of useful links, compose exercises/quizzes, make announcements, and have students submit papers. To illustrate the services architecture, we will go through an e-learning scenario. A student first searches for an online course: the broker handles the request and returns a set of choices satisfying the query. If no course is found, the user can register with a notification service. Otherwise, the user may find a suitable course among the offerings and then makes a final decision about registering for the course.

PROFESSIONAL DEVELOPMENT PROGRAM

Over the past decade, PDP (Professional development Program) has gained recognition as a leader in adapting emerging instructional and communication technologies in order to develop, refine, and expand e-learning training solutions. As a function of its leadership in developing and promoting the use of technology for learning, PDP: Develops and delivers workshops that familiarize training professionals with the use of technology, recommends proper applications of technology to specific training needs.

Because there is no single model that fits all training needs, PDP typically examines several dimensions of a proposed project including type of content, learner profile, hardware specifications, desired performance outcomes, and agency training history before recommending an approach. Solutions that have been developed include:

Self-paced, stand-alone instruction on CD-ROM or the web Instructor-led ,web-based training.

Blended learning instruction combining technologies and delivery methods to maximize resources and learning outcomes.

IMPORTANCE AND RELEVANCE OF THE STUDY

“The Semantic Web is not a separate Web but an extension of the current one, in which information is given well-defined meaning, better enabling computers and people to work in cooperation [3].”Our current web is machine readable, while it is not machine understandable. The semantic web is a vision to solve this problem. Semantic web is an evolving extension of

web, in semantic web information is machine understandable, precise, and ready for software agent to process, reuse and share it to describe the meaning of data .Machine understandable indicate the machines ability to solve the problem by applying operation on data. The essential component of the semantic web is eXtensible Mark-up language (XML), XML scheme, Resource Description Framework (RDF), RDF 14 scheme, Web Ontology language (OWL).

LEARNING OUTCOMES

Serious work in the area of ELG can bring significant changes in this direction and also can give a new shape to Indian Semantic Web & Machine Learning research work. Just as the Semantic Web is beginning to empower and energize content on the Web, the underlying principles and technologies can energize and enhance the long-standing knowledge-management discipline. Several frameworks within knowledge-management theory set contexts for scientific debate. Some emphasize the knowledge life cycle, others the knowledge product, and many researchers have recently begun to emphasize the knowledge and social networking perspective, as previously described. Semantic Web tools and applications contribute significantly to knowledge management's performance, providing a definition for flexible reference mechanisms to knowledge objects and knowledge contributors; integration of knowledge creation and use; integral human involvement in information- and knowledge-management activities; and a definition for and the exploitation of social networks, including social activities and context.

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EXPERIMENTAL ANALYSIS OF CRITICAL STRESS INTENSITY FACTOR OF PRESSURE VESSEL MATERIAL USED IN DISC SHAPED TENSION SPECIMEN

B. C. Patel
M.Tech Student, Mech. Engg. Dept., O.I.S.T., Bhopal
Bharat Gupta
Professor, Mech. Engg. Dept., O.I.S.T., Bhopal
Abhishek Choubey
Professor, Mech. Engg. Dept., O.I.S.T., Bhopal

ABSTRACT

Stress intensity factor (K) is used in fracture mechanics to more accurately predict the stress state ("stress intensity") near the tip of a crack caused by a inaccessible load or residual stresses. The present work describes to evaluate important fracture toughness parameters like stress intensity fracture. The present work is aimed to test mechanical properties of pressure vessels materials IS 2062 and SA 516 Gr-70 with different thickness 12,16,18 and 20mm and critical stress intensity factor of disc shaped compact specimen DC(T) which have crack/width ratio 0.5 as suggested by ASTM E-399.

Keywords: Fracture Mechanics, Critical Stress Intensity Factor, Pressure Vessel, Disc shaped Compact DC[T] Specimen

Nomenclature:-

a	crack length
B	thickness of the specimen
K_{1C}	Critical stress intensity factor for Mode-I
K_Q	Critical stress intensity factor
P_Q	Load at peak
W	width of the specimen
DC[T]	Disc shaped compact specimen
LEFM	Linear elastic fracture mechanics
SIF	Stress Intensity Factor

INTRODUCTION

Fracture mechanics is based on the implicit assumption that there exists a crack in a work component. The crack is artificially prepared in different shapes i.e. a hole, a notch, a slot, a re-entrant corner etc. The crack may exist within a component due to manufacturing defect like slag inclusion, cracks in a weldment or heat affected zones due to uneven cooling and presence of foreign particles, A dangerous crack may be nucleated and grown during the service of the component (fatigue generated cracks, nucleation of notches due to environmental dissolution). Fracture mechanics is with the question, a known is crack likely to grow under a certain given loading condition. Fracture mechanics is also applied to crack growth under fatigue loading. Initially, the fluctuating load nucleates a crack, which then grows slowly and finally the crack growth rate per cycle picks up speed. Thereafter comes the stage when the crack length is long enough to be considered critical for a catastrophic fracture failure.

Many components of the modern industrial world are subjected to fluctuating loads and consequently may fail through fatigue. In fact, failure through fatigue is so common that more than 80% failures are caused by fluctuating loads. Many investigators are currently working for the development of this field. However, convenient and effective methods to control fatigue failures are still not adequately developed. A critical structural component should be regularly checked to detect fatigue cracks through non-destructive tests. These has led to the development of excellent method of crack identification, such as ultrasonic crack detection, X-rays or radiation filming, detecting through monitoring acoustic emission, magnetic flux method, decoration of surface cracks through die-penetration, etc.

Fracture mechanics is now applied extensively in the important field like nuclear engineering, piping, space ships, rockets, offshore structures etc. Critical components in nuclear power plants are made from vary tough materials but they too have failed catastrophically once in a while.

LITERATURE REVIEW

Webster et al. investigated the failure of thick walled tubing subjected to internal pressure [1]. Thick-walled tubing is used for variety of applications in the chemical, nuclear and armaments industries where high internal pressure has to be withstood. If this pressure is cyclic, initiation and propagation of cracks by fatigue may take place with the ultimate risk of

failure by fast fracture. Usually fatigue crack in thick walled cylinders initiate at the bore and propagate in a radial plane in the manner illustrated (Fig.1).

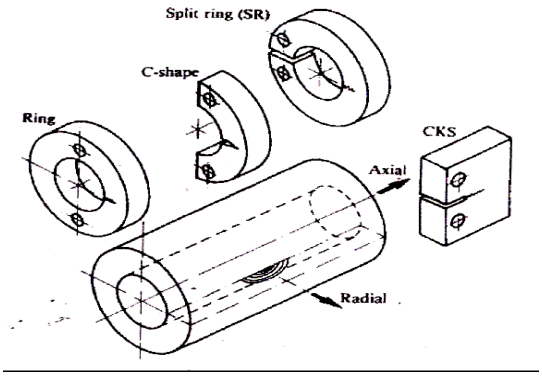

Fig.1 Test pieces for fatigue crack growth studies of thick walled tubing

Fujczak and Throop reported experimental strains and load-line deflections of C-shaped fracture-toughness test specimens as functions of load and increasing crack depth (Fig. 2). It is shown that the variation in strain at the outer surface may be used as indicator of fatigue crack growth for evaluating the critical load in fracture toughness tests. The stresses and load-line deflections are compared with theoretical values calculated for the un-cracked specimens. Their relation to the stress intensity factor of the cracked specimen was examined [2]. The important conclusion of their work was that 'in the pin-loaded C-shaped specimen the strains on the inner surface are related to crack depth only for very shallow crack depths.

Guerrero et al. calculated the behaviour of a pressure vessel (PV) made of high strength steel(P500) subject to the designed loads and assuming the existence of the "worst case" crack allowed by the European standards in order to demonstrate the shape use of this steels and the too conservative design rules currently applied by the pressure vessel manufacture codes [3]. It was demonstrated that the presence of cracks on pressure vessels made of high strength P500 steel non-detected during non-destructive test do not endanger the safety of vessel.

The three principal stress distributions along the crack tip are presented in Fig. 2. The axial stress is normal to the surface of crack and the one that causes the crack to open.

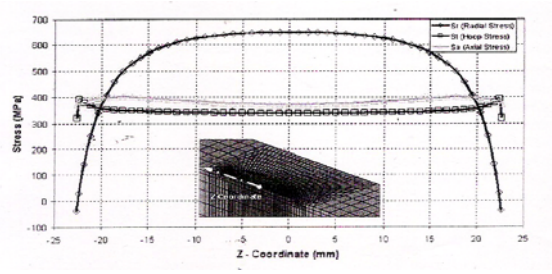

Fig.2 The three principal stress distributions along the crack tip

Zheng et al. has discussed method of calculating stress intensity factors for cracks subjected to complex stress [4]. The method is based on the use of generalized weight functions.

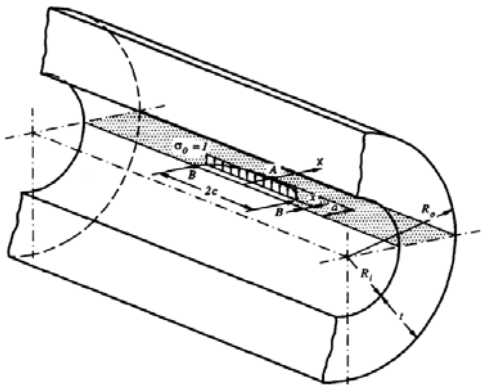

Fig 3 Internal, radial-longitudinal, surface, semi-elliptical crack in a cylinder

It has been shown that the weight function enable the determination of stress intensity factor for variety of geometrical and stress field configuration. The crack opening displacement analysis based also on the use of same weight functions revealed that crack in auto-frettaged cylinder (refer Fig. 3) may remain partially closed indicating that the usual superposition method might not be valid in some cases.

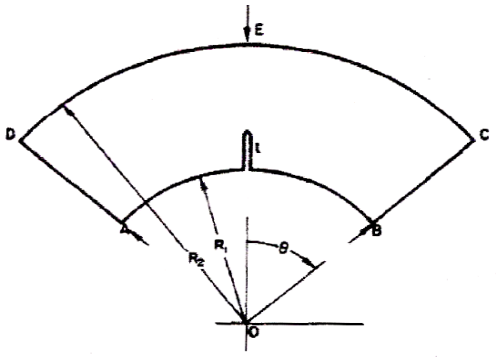

Fig.4 Circular ring section with crack

Peter et al. considered the problem in a circular ring segment with a radial crack emanating from a surface with the smaller radius [5]. Pure bending and three point loading are chosen

for solution. The problem is solved using modified mapping technique and partitioning. This procedure is used to calculate stress intensity factor and displacement for primary loading system which is the bending couples applied at the ends BC and AD in Fig.4

Ishio et al. in their paper, the results of fracture toughness and mechanical tests of pure niobium plates (3-mm-thick) and welded joints for superconducting cavities at 4 K are reported (Fig 5) [6].

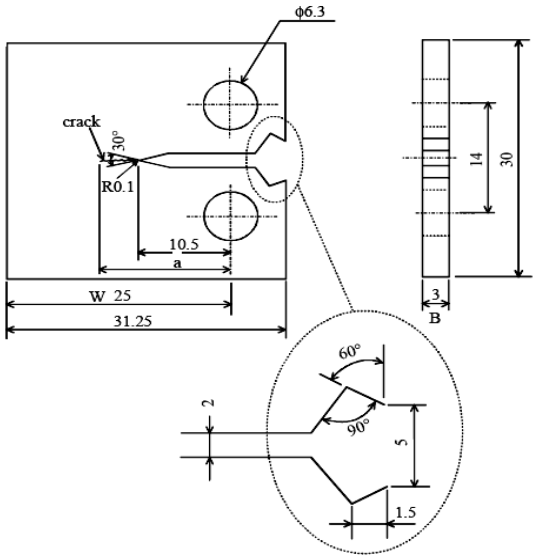

Fig. 5 Shape of fracture toughness specimen (1/2 CT)

The result shows that the fracture toughness (KQ) for bulk Nb at 4 K is 45.5 MPa·m 1/2, and 33.5 MPa·m 1/2 for weld bead. The fracture of Nb at 4 K initiates the microvoids and micro-cracks, and finally these defects cause the cleavage fracture.

Shahani et al. have studied that steady state thermo elasticity problem in a thick-walled cylinder containing an internal axial semi-elliptical crack is solved analytically [7]. Thermal and mechanical boundary conditions are prescribed on the inner and outer surface of the cylinder. The steady state solution of the thermo elasticity problem is derived analytically and then, the stress intensity factors are extracted for the semi elliptical crack using the weight function method. The results show to be in accordance with that cited in the literature in the special cases. It is shown that the critical point of the crack front displaces from the deepest to the surface points at certain geometries for an internally pressurized cylinder, which can indicate the point of starting the crack growth. However, in an internally heated pressurised

cylinder, the surface points are always in closure mode and the deepest point is always the critical point in the geometries in which it falls in the opening mode.

EXPERIMENTAL METHODOLOGY

Before presenting the details of K_{1C} test, it is summarized as follows. To begin with, K_{1C} of specimen is guessed. Then, the specimen is prepared following several dimensional constrains which are based on the guessed value of $K_{1C.}$ The crack tip is made very sharp with a fatigue growth. The specimen is pulled in a tensile machine to obtain a relation between a load and a crack mouth opening displacement. This relation provides the critical load P. Accounting for the crack length and geometry of specimen the stress intensity factor K corresponding to P is determined using LEFM. If K satisfies all the constrains on the geometry of the specimen and of, fatigue growth, it becomes K_{1C}. Critical stress intensity factor indicates the upper limit of SIF which can be allowed in the component. In this work, critical stress intensity factor has been found experimentally for pressure vessel steel IS2062 and SA516 Gr.70. using disc shaped tension specimen as suggested in ASTM E399. Variation of critical stress intensity factor with thickness of specimen has been studied.

As suggested in ASTM E399, load V/s load line displacement is needed for the calculation of the force P_Q. Hence, the UTM of suitable capacity is used. The data acquisition system was chosen such that required graph of load V/s load line displacement is obtained. The least count of machine is 0.1KN and 0.1mm in force and displacement respectively.

DISC SHAPED COMPACT SPECIMENS BY ASTM:-

As per ASTM, various shaped of compact specimens are available for carrying out the experimental work. Out of them, the following disc shaped compact specimen is selected for experimental work. The geometry is shown in Fig.6.

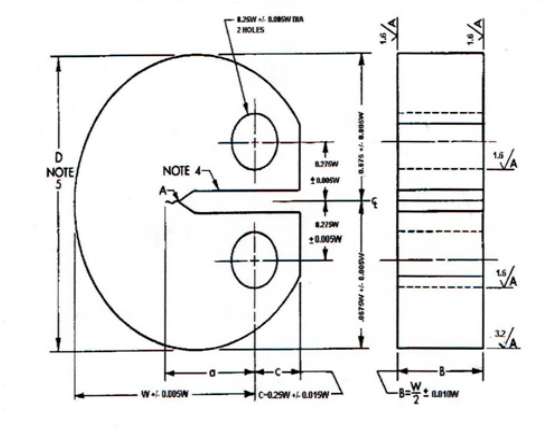

Fig. 6 Geometry of disc shaped compact specimen

Fig. 7 DC[T] Specimen 12mm thick having wire-cutting notch of an angle 38^0.

Two materials IS2062 and SA516 Gr-70 are selected for experiment. Specimens are prepared for the thickness of 12 mm, 16 mm, 18 mm & 20 mm from both the materials. Specimen for 12 mm thickness is shown in Fig.7. The Specimens are loaded in the Universal Testing Machine TUE-CN-1000KN of Fine Spavy Associates make as shown in Fig-8.

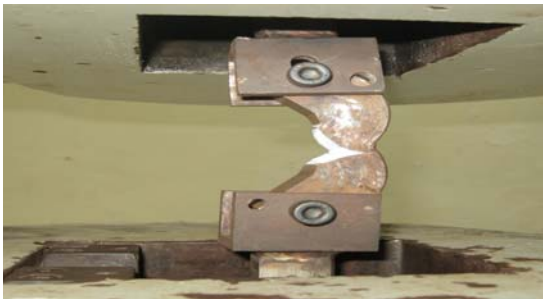

Fig. 8 Experimental set-up showing crack propagation in loaded specimen

RESULT AND DISCUSSION

From the graph generated, the value of peak load P_Q is taken for calculating critical stress intensity factor (K_{1C}). Load vs. Cross head travel is obtained from the UTM as shown in Fig.9.

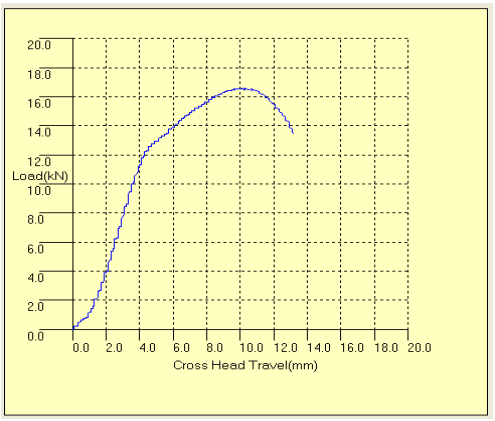

Fig. 9 Load vs. Cross head travel for 12mm thickness specimen (SA516 Gr-70)

The experimental values for critical stress intensity factor are calculated using following equation and shown in Fig. 10 and Fig. 11.

$$K_{1C} = \frac{P}{BW^{1/2}} f(a/W) \text{ MPa.m}^{1/2}$$

$$\text{where, } f(a/W) = \frac{(2+a/W)}{(1-a/W)^{1/2}}[0.76+4.8a/W - 11.58(a/W)^2 + 11.43(a/W)^3 - 4.08(a/W)^4]$$

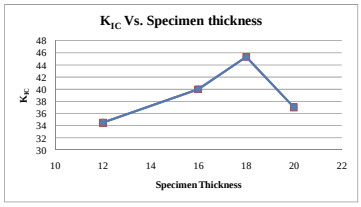

Fig. 10 K_{IC} Vs. Specimen thickness for SA516 Gr-70 material

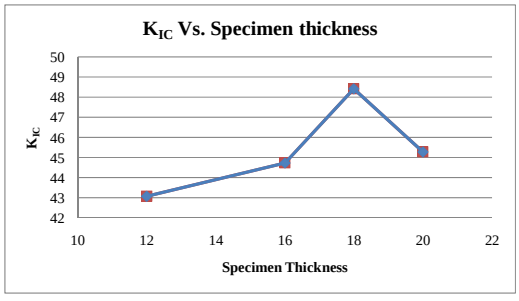

Fig. 11 K_{IC} Vs. Specimen thickness for IS2062 material

CONCLUSION

In present work experimental value of critical stress intensity factor are obtained by performing the test as per ASTM standard E-399. The calculated values for both the materials are shown in the above table.

It is also observed that for SA516 Gr-70 material as thickness increases stress intensity factor increases except for 20 mm thickness. The similar thing would found out for IS 2062 material.

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NOVEL IMPLEMENTATION OF RETRIEVING BUSINESS APPLICATIONS USING OPEN WEB API'S WEB MINING – EXECUTIVE DASHBOARD APPLICATION CASE STUDY

A.V.MURALI KRISHNA

Assistant Professor, CS Dept MIPGS Hyderabad, A.P., India

G.VISHNU MURTHY

Associate Professor, CSE Dept, CVSR College of Engineering, Hyderabad, A.P., India

B.VENKATESHWAR REDDY

Assistant Professor, CSE Dept, CVSR College of Engineering, Hyderabad, A.P., India

ABSTRACT

Web mining is new area of research in information technology; so many business applications that utilize data mining and text mining techniques to extract useful business information on the web have emerged from web searching to web mining. It is important for students to acquire knowledge and hands on experience in web mining during their education. In order to effectively utilize the power of web, information technology professional need to have sufficient knowledge and experience in various web technologies and applications. Recently many large companies such as Google, Microsoft, Amazon, e-Bay have opened access to their services and data through Application Programming Interfaces (APIs). In education, these APIs provide an ideal playground for students to acquire a valuable experience in leveraging the APIs to build interesting web mining applications. With the advent of the World Wide Web, many business applications that utilize data and text techniques to extract useful business information on the Web have evolved from Web searching. This paper reports on an experience using open Web Application Programming Interfaces (APIs) that have been made available by major Internet companies (e.g., Google, Amazon, and eBay) in a project to teach Web applications. The observations of the performance and a survey of the APIs show that we achieve project objectives and acquire valuable experience in leveraging the APIs to build interesting Web applications. We build website called "Executive DashBoard" an e-business idea: provide a platform for users to gather specifically useful information for their special products to sell or buy. DashBoard could provide complete production information, such as retail prices on Amazon, auction prices and seller details on eBay, and hot news of certain items from Google.

Keywords— ***data mining, information systems, web mining, open web APIs, education.***

1. INTRODUCTION

Standing on the Giant's shoulder, we can always look further and more widely.[1] Encouraged by the promising access huge, open data warehouses of Amazon, eBay, and Google, came to a creative e-business idea: provide a platform for users to gather specifically useful information for their special products to sell or buy. In order to make our dream come true, we did our all efforts to establish a powerful website to fulfill the potential requirements of our target users and named it "DashBoard". We expect our product, DashBoard, could provide complete production information, such as retail prices on Amazon, auction prices and seller details on eBay, and hot news of certain items. In the future, DashBoard will become an all purpose community not only to serve general Internet users but also to provide bring manufacturers and other businesses important information.

According to above brainchild, we consider following five perspectives to construct the business model of DashBoard: target customers, services provided, potential business partners, information resources and financials. Our target customers are users who want to compare prices before buying, which prefer buying products online, and who prefer applications which emphasis community interaction. Moreover, we provide services including product information gathered from eBay and Amazon, Google searches related to customers' wish items and the consuming trend information.

As to potential business partners, we expect to collaborate with e-market places such as Yahoo! Auction, and online retailers as well as Walmart.com. In addition, we will get information resources from e-Bay, Amazon, Google, and our business partners. The financial opportunities in the platform would be positioned on different business values. Basically, in the short term, we may attract some advertisements and our statistics information to sustain the operation overhead of DashBoard.

Based on mentioned business model, DashBoard is implemented by accessing API (Application Programming Interface) of Amazon, eBay, and Google, by presenting a user friendly environment. It is a critical success factor for DashBoard to combine above

components closely and effectively so we have to overcome many research questions which are detailed as following.

2. LITERATURE REVIEW

A. Existing System,

Each research design includes ways of collecting information, such as, analyzing the contents of documents, conducting an opinion survey, observing people's behavior, administering tests, or carrying out an experiment. Similarly our research work also has many related surveys done. There are many websites which give product details and online shopping facilities to the users. In spite of all these few web applications still don't provide user expectation results and the exploitation the information might take place.[2]

How to expand the market is always one of the most concerned issues in business. The initiative of procuring customers' wishes has been proved to be one of the most efficient ways to understand what the market needs, and this has been widely adopted in business. Based on the customers' wish-lists, business distributes to them their product information via various channels, like email, personalized dynamic web content.

This strategy, on one hand, provides business a useful channel for advertising; on the other hand, customers get informed about those products they are interested in. Tons of businesses have integrated this method in their marketing strategies, like www.Half.com.

No matter how innovative techniques the aforementioned businesses apply to make full use of customers' wish-lists, they share one thing in common - they are trying to sell what they want to sell. However, our project set out to provide a quite different kind of service to customers who enter in our website, where they can really enjoy the pleasure of being served like God.

B. *Proposed System*

After overall business model of DashBoard is initiated, some important research challenges should be overcome. These challenges could be categorized in three topics, friendly user interface, web-service APIs, and their integration.

Friendly User Interface:

Because Dashboard is design for supplicated Internet users as well as aged and young users, it is very important for Dashboard to build up a friendly environment to serve multi-aged users. Therefore, there are three major issues of user interface.

First, the operation processes of Dashboard should be very easy to use, and there should be some clear instruction to guide users with diverse information literacy to perform powerful functionality of Dashboard. Second, interesting and lovely interface is critical for Dashboard to attractive more traffic. Last, well-design interface should combine and present all functionality in Dashboard.

Therefore, in Dashboard, lots of easily understandable pictures and figures will be used to teach first time users how to operate functions so users do not spend much time to do "try-and-error". Meanwhile, lively interface will promote the reputation of Dashboard significantly.

Web Services API's:

According to initial plans, there are three APIs which are implemented in Dashboard and these APIs come from Amazon, Google, and eBay. Basically, APIs of each web-service provider need to be tested because there could be some conflictions between APIs and system architecture.

Moreover, the combination of different APIs provided by different web-service providers should be paid more attention. For instance, how to integrate different data formats of heterogeneous APIs is critical technical issue to solve.

In order to achieve the planned functions, some Amazon APIs, such as customers' wish-list retrieval and item search, are implemented in Dashboard. Furthermore, available auction search of eBay API is used to provide users valuable auction details. As to Google's APIs, new search is important to be adopted to search hot news related to products.

C. ANALYSIS

Features of our project

The dashboard application is designed to allow users, such as business executives, to easily retrieve product information and reviews from multiple sources. Business executives may

want to use the program to quickly review information about products they sell, as well as products sold by competitors. Other individuals, who are shopping for information about a product before making a purchase, can also benefit from the application.[3]

The featuring of the project depends upon the modules that are set in our project.

- The form for the user to enter the search criteria.
- Amazon search
- Google search to the epinions.com domain
- EBay search
- Writing the results to the browser

The form:

A user is able to fill in a search criteria and click a Search option on the screen.

Amazon search:

The Amazon.com API is called to retrieve the first result in the electronics department that contains the specified search criteria. The URL corresponding to the page is then retrieved so the physical Amazon.com page can be loaded into the browser for display.

Google search to the epinions.com domain

The Google API is called to retrieve the first result on the epinions.com domain that contains the specified search criteria. By limiting the Google search to the epinions.com domain, the first result is likely to be an exact or close match to the actual search criteria. After the URL is identified by Google, the contents of the physical Epinions page can be loaded into the browser for display.

EBay search

The eBay API is called to retrieve a list of auctions that match the specified search criteria. The application uses the eBay Sandbox test API, although the exact code would also work with the live eBay site.

Writing the results to the browser

The results from the Amazon.com, Google, and eBay APIs are displayed in a single browser window so the user can simply scroll down to view the search results.

From the literature survey done of this research we can come to a conclusion that there are many problems faced by the existing online shopping web applications and hence our new proposed model will surely solve those problems up to certain level. Here by we conclude by saying our project would serve several web applications in improving their way of approach in providing services in an efficient way.

The View of the Architecture

Software architecture essentially forms the skeleton of the information system. It is mainly concerned with the implementation aspects, depicted in a layered form established to represent the messages, communication, information flow among the packages, modules, subsystems and finally components through the well defined interfaces. [4-7]

Dashboard is an application written in .NET. Users access the application through a web browser (i.e. Fire fox, Internet Explorer), and the web browser uses HTTP requests to interface with our application, which is hosted in a visual studio background. Dashboard connects to EBay, Google and Amazon via Web Services. Using SOAP calls, the application is able to dynamically request and receive information from each site. (Refer to Figure 1 which shows the architecture of the entire application)

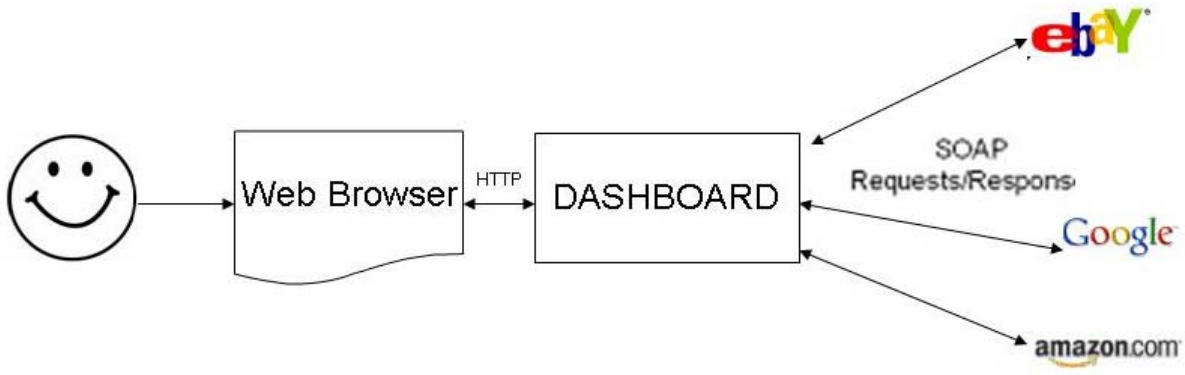

Figure 1. The architecture of the entire application

The above figure shows the architecture of our application. The user interacts with the browser. The browser interacts with the application using HTTP requests and responses. The application on the backend interacts with the APIs Google, Amazon and eBay using SOAP.

Sequence diagram of application Refer to Figure 2 which shows the sequence diagram of the application.

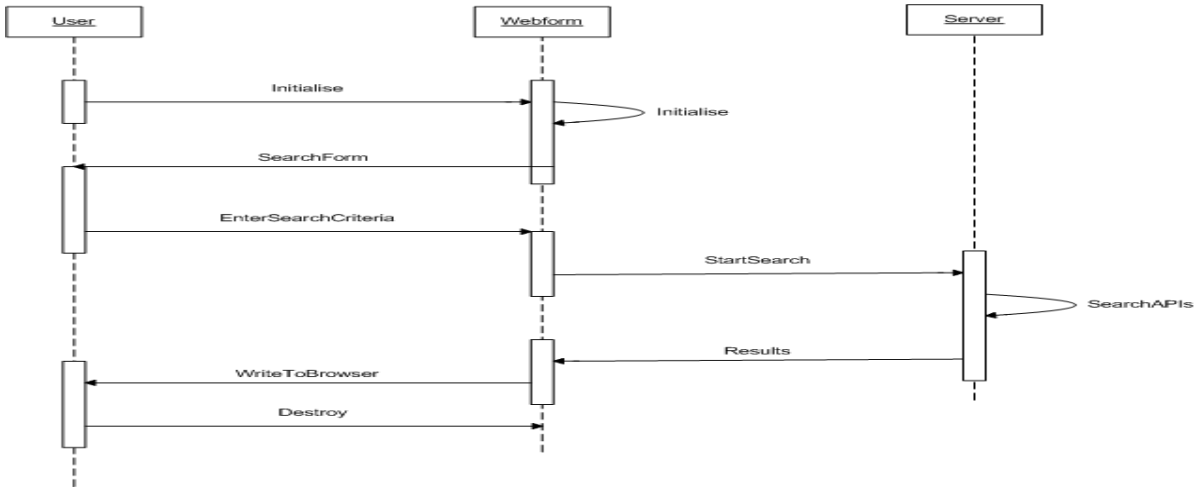

Figure 2. Sequence diagram of the entire application

This is the first screen we get after successful execution of the application. It is the user interface. We designed the interface to its simplest form. It consists of a text box where the user has to enter the search criteria. There is a button which on click goes to the next screen.(Refer to Figure 3 which shows the first screen shot of the application)

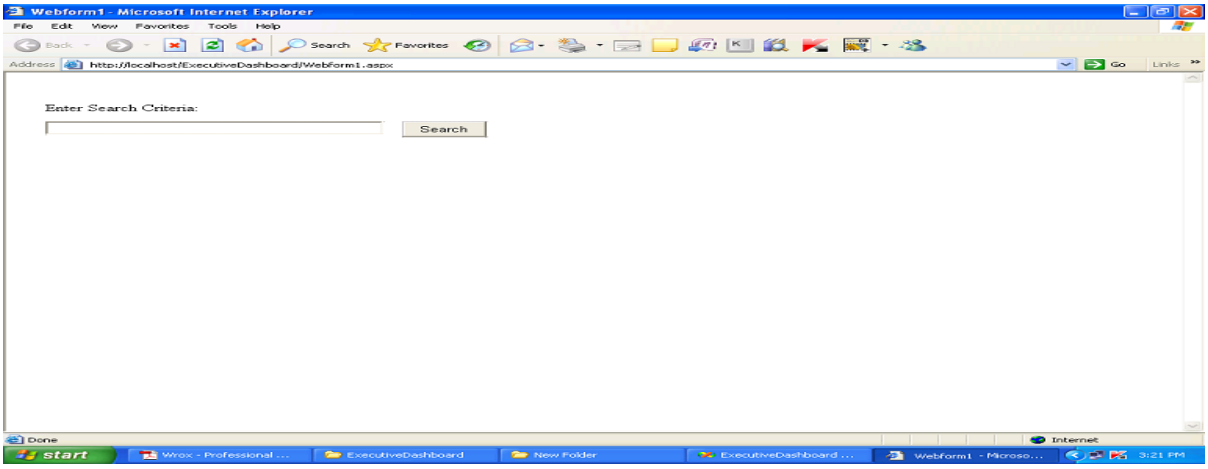

Figure 3. Initial Screen shot of the application

On click of the search button the user is directed to the results page. Here as we can see we first get the results from amazon.com.

In our example we searched for the item “apple iPod mini.”(Refer to Figure 4)

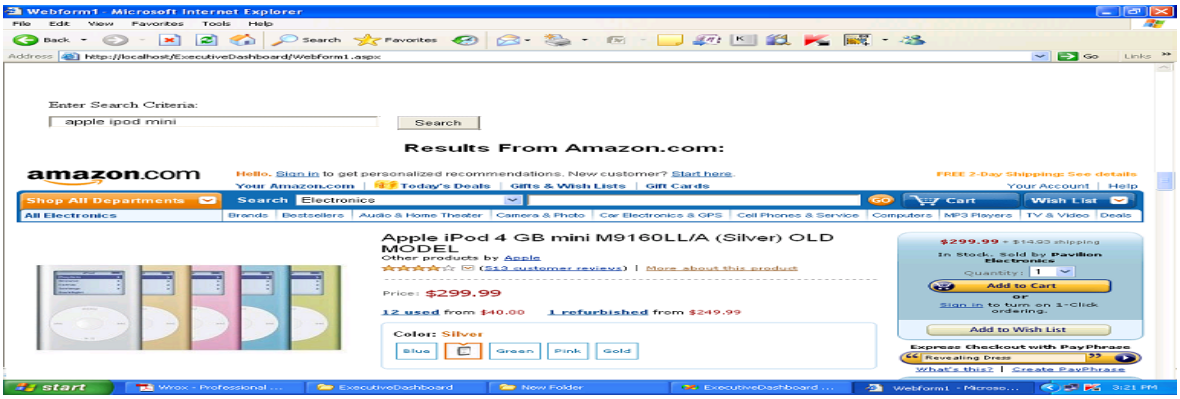

Figure 4. Search for Apple ipod mini

Below the results from amazon.com the user view the results from "epinions.com" for the same item as shown. The results from "epinions.com" are accessed via google.com. (Refer to Figure 5)

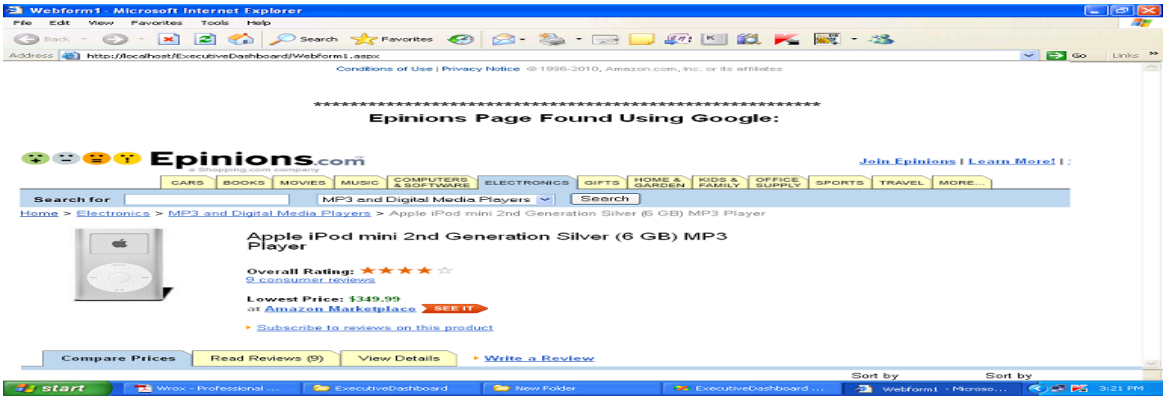

Figure 5. Results of Searching

This is the final phase of the application where the results from eBay are displayed for the search item. As in our example "Apple iPod mini".

This is the end of implementation phase as all the screens show the fulfillment of the requirements of the client.(Refer to Figure 6)

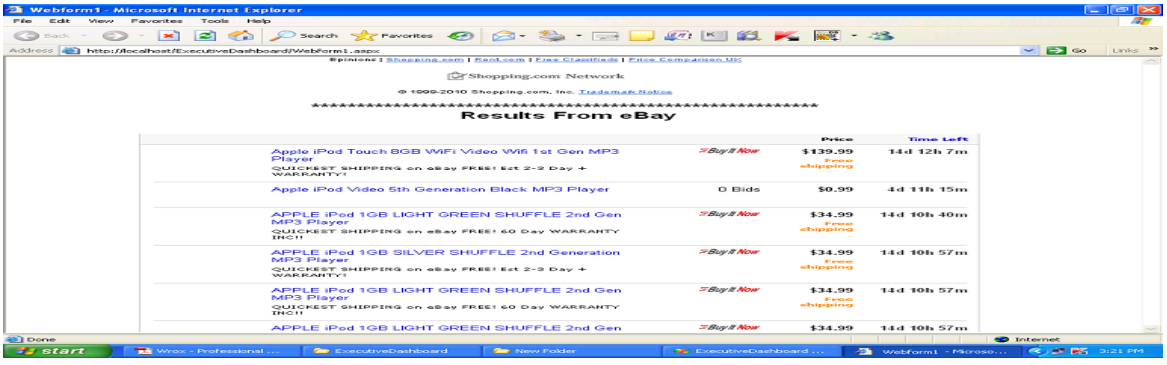

Figure 6. Final Results of Implementation

CONCLUSIONS AND FUTUR WORK

We are so glad to see what we have achieved after a long semester effort- a business website with an innovative business idea, comprehensive and considerate service, friendly and warm interface, most importantly, the optimistic huge market value. This is from a cooperative and hard working team. At the beginning period of our project, we proposed several different plans, and each sounded very reasonable, but we respected each other's idea, and discussed without biased in order to choose out the best one.

During the designing period, we all tried to do what he or she could do, and no one talked about if the work distribution was fair or not. Furthermore, we helped each other out, and never retained anything within him or her. We learned from each other, and encouraged each other whenever we felt depressed. Due to the lack of practical experience in developing complete systems, we did feel a lot of pain during the process for this project, as we always came up more requirements than planned while having to make the schedule. But the best thing was we had never given up, and we came to know that things can be more perfect but never be completely perfect. The result was we were very happy to see the good responses from the professor and our classmates during the demo. We sincerely hope that all the users of "Dashboard" realize their wishes as we did.

In order to continue our great dream of Dashboard, we, of course, will put more efforts in it so we have some future plans to create more value-added functions, design more interesting interfaces, and even integrating more APIs of web-services. The major future plans are summarized in the following directions.

APIs

Web Services is still a new technology, a novelty that applications (Web or Desktop) are just starting to use. Most likely, this technology will evolve and change rapidly. To take advantage of new features and bug fixes, Dashboard will also need to update to newer versions on a regular basis. Also, because of time limitations, for now the Dashboard application can only search for items on eBay and Amazon. Future development may allow users to actually buy items or post items for auction in eBay. A key idea of Dashboard is to allow users to see buyer demand before auctioning items, and to find out which items are popular, and likely to receive more bids. It only seems only natural to also allow users to

quickly auction an item where they never have to leave our interface, and may then be tempted to use a competing application's software.

User Interface

We could provide more functions for our customers to personalize their own interface in the future. Our customer can upload their personal photo to be the welcome logo, and adjust the interface color by their preferences. In addition, they can design and change each block of the interface with their interests and the interface will show all of the interesting functions based on different customers.

Meanwhile, the platform will dynamically show different information and functions for different customers based on their individual interests and settings. In briefly, we hope we can provide a personalized space for our customers to enjoy all of information what they want.

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