HARNESSING THE TEAM POTENTIAL OF EMPLOYEES THROUGH GROUP INCENTIVE SCHEME

[1]S. Vasudevaiah

[1]Research Scholar, Sr. Divisional Mechanical Engineer SC Railway

[1] Rayalaseema University, Kurnool, India

Abstract : This is a study on Wage incentive scheme of the Indian railways with reference to Carriage Repair Workshop Tirupati in South Central Railway. The study aims to suggest methods to improve the existing group incentive scheme being implemented there and also to examine the hypothesis whether short term incentive relates the individual to the overall performance of the organization. The study covered the incentive production groups in the workshops. The study examined Group Incentive Scheme with reference to Tirupati workshop. The GIS which offers a Win- Win environment to the management and to the employees needs certain changes as per the requirements of the ground realities.

Index Terms - **Group Incentive Scheme (GIS), Carriage Repair Workshop (CRW) Tirupati, Wage Incentive, Bonus, Railway employee bonus scheme.**

I. INTRODUCTION

Wage incentives can be offered on individual or on group team or basis. Among the employees individual incentive plans have better appeal than the latter because primarily they require self effort on the part of the employee. However, there are certain limitations in individual incentive plans.Three major limitations in individual incentive plans which HR managers encounter in their implementation are1:First, because of the hierarchy involved in their implementation individual incentive plans tend to promote rigidity. To set the goals workers in individual incentive plans are dependent on their supervisors. When employees become proficient in their work they may not improve their performance beyond the ceiling limit on the incentive because they would not get incentive bonus for the output they produce above the ceiling limit. Second, in individual incentive plans the responsibility of measuring the worker performance rests on the supervisor which throw a challenge to the supervisor versus the worker particularly when new and better work systems are introduced or when new machinery is installed. It will be a problem to the organization to modernize the plant as it will involve delays in the up-gradation of the skills of the employees who will resist modernization for fear of losing their incentive bonanza. Third, individual incentive plans may lead to undesirable behaviour at workplaces when the scheme provided incentive only to a part of the activity of the total employee field of operation. For example if incentive scheme is applied only to the quantity of output produced by the employees ignoring the employees involved in quality wing and customer relations these left out employees may become inimical to or develop jealousy towards the production workers.

II. REVIEW OF LITERATURE

Two main developments in the U.S. led to the use of teams or groups in the workplace[2].

In 1990s Japanese companies started several businesses in the U.S. especially in the automobile sector. The companies deployed teams which yielded better results and quality output. The second development was team based assignments helped innovation in Rubbermaid, a manufacturer of plastic household products[3].

Organisations have to alter their individual incentive plans to switch over to team or group based incentive schemes4. Team based incentive scheme should promote cooperation between and within the teams. The plan has to reward the employees for the additional assignments they attend as a member of the group besides each member encouraging his associates in the group to achieve the set goals of the team[5].

In general individual incentives or merit or seniority do not promote collective or team behaviour and they may even become a handicap in realizing team potential. The very concept of hierarchy based seniority and merit is incompatible to group based performance[6].

Team based incentive schemes encourage the members to acquire new skills and take up wider roles than those under the traditional individual incentive plans. Further, employees in a group need not receive orders from their superior and they are free to take up activities that fulfil the tasks assigned to the group. Greene says team based incentives are similar to individual incentives with a difference. Each member receives the incentive for achieving the group goal. While there are several kinds of team incentive programmes, companies define the incentive programme based on the type of team7. Work teams refer to organizational units that discharge the functions of the organization on an ongoing basis. For example, timely completion of a market survey by a group. Work teams refer to organizational units that discharge the functions of the organization on an ongoing basis. Belcher mentioned that gain sharing plans describe group incentive systems that offer the employees involved with incentives based on improved performance of the organization, increased productivity, increased customer satisfaction, lower the costs or better safety records.8   According to Doyle gain sharing programmes generally have three components; Leadership philosophy, Employee

involvement systems and Bonus9. Leadership philosophy implies a cooperative organizational climate encouraging high level of trust, open communication and participation. Second, employee involvement systems promote the organization's productivity increases. The employees are free to make suggestions and innovative employee involvement ways like problem solving are encouraged. Third component, bonus is a gain sharing plan. The sharing is usually based on a mutually acceptable formula which employees feel is fair and the employer considers that it would improve the organization's performance. Milkovich felt the success of gain sharing is attributed to the organization's support to cooperation among employees[10].Scanlon, Rucker and Improshare gain sharing plans are the most common forms used and they were the first plans developed.

Joseph Scanlon developed his Scanlon plan with emphasis on employee involvement. Employees committed to the organization's objectives will exercise self direction and self control and given an opportunity they will accept and seek out responsibility[11]. Scanlon plan is a generic term indicating a gain sharing plan having characteristics of the original plan developed by Scanlon. Scanlon plan has three components: Emphasis on team work to bring down costs assisted by management provided data on production concerns; Suggestion systems to route cost-saving suggestions from employees through a labour management committee which evaluates and acts on the suggestions, and; A monetary reward based on productivity improvements to encourage employee involvement. Thus the four basic elements of Scanlon plan are: ratio, bonus, production committee and steering committee. The ratio is the standard which serves as a measure for measuring business performance. Ten variables like machinery; changes in processes and procedures, product mix, quality and cost of raw materials; Labour cost, customer service requirements, delivery procedures, inventory policy, sale price of goods or services and financing and funding pattern have an impact on the following Scanlon ratio.

$$\frac{Total labour cost}{sales value production}$$

Allan W. Rucker developed his Rucker Plan in 1933. This plan also stresses on employee involvement and even provides monetary incentives to encourage employee participation. But Rucker plan uses value added formula to measure productivity. Value added is the difference between the value of sales price of a product and the value of materials to make the product. The total of all added values from each step along the way to the consumer equals the total contribution to the overall economy from the chain of events[12].

The following ratio under the Rucker plan is used to determine whether bonus can be awarded.

$$\frac{\text{Value added}}{\text{Total employment costs}}$$

Mitchell Fein propounded his Improshare gain sharing plan i.e., improved productivity through sharing in 1973. Unlike the Scanlon and Rucker plans, Improshare measures productivity physically than in monetary saving terms. The emphasis is on providing employees with incentive to finish products, aiming to produce more products with fewer labour hours. Bonus here is based on a labour hour ratio formula.   Analyzing historical accounting data, a standard is arrived at the number of labour hours needed to complete a product. Productivity wise it is the ratio of standard labour hours and actual labour hours.

$$\text{Productivity} = \frac{\text{Standard labour hours}}{\text{actual labour hours}}$$

III. INDIAN RAILWAYS AND EMPLOYEE INCENTIVE BONUS SCHEMES

Indian Railways (IR) is one of the world's largest rail networks in the world. The size of the network is simply mindboggling – 67,368 Route Kilometres, 93, 902 Running Track Kilometres and 1, 27, 407 Total Track Kilometres.

As bulk freight carrier Indian Railways transports minerals, industrial products, food grains at a cost effective manner unequalled by many other modes of transport. During 2015-16 the Indian Railways carried 2.22 crore passengers and 30.3 lakh tons of freight which speaks volumes of its popularity and efficiency. Handling transport of this magnitude naturally requires a large fleet of locos and wagons. As on 31st March 2017 the Indian Railway locomotive fleet consisted of 39 steam, 6023 diesel and 5399 electric. These locos hauled 64,223 passenger coaches and 2,77,987 freight wagons[13].

An efficient maintenance system is called for to attend to servicing, break downs and repairs to this huge fleet of locos and wagons. On average there are two workshops in each railway zone to maintain and repair the railway coaches apart from one or two workshops to maintain and repair locomotives. These workshops have to function on almost 24x7 basis since much of the railway revenue is dependent on their maintenance. To motivate the workers bonus incentive schemes are being implemented for faster maintenance and repair works of the coaches according to standards.

Out of three Workshops functioning under the jurisdiction of South Central Railway, two different incentive bonus schemes are being implemented in the Carriage Repair Workshop, Tirupati and the Lallaguda Carriage Workshop, Secunderabad. Group Incentive Scheme (GIS) is being implemented in the Carriage Repair Workshop, Tirupati. This article aims to study the analyse the implementation of Group Incentive Scheme in the Carriage Repair Workshop, Tirupati.

3.1 What's Team or Group Incentive Scheme (GIS)?

Team spirit and individual effort are crucial to attain the goals of an organization. Industrial production activity is therefore like a sport or game. Sometimes it will not be possible to apply individual systems as the work has to be performed by a group of workers in more than one operation. For example, in a steel melting furnace in Engineering works it is impossible to

measure the output of individuals. Since the assignments are intertwined and the employees have to support each other and strive together group incentive is therefore offered to them to sustain their collective effort and for bettering the group activity. In such situations, payment by results system can be introduced to a group of workers, through normally piece-work system is on hand. But there are advantages in group systems since it would encourage collective involvement.

The earnings of each member of the group are determined first by measuring the amount of production which passes inspection as it leaves the group. The total earnings of the group are avoided at. If all the members of the group are of equal skill the earnings are divided equally among them. However, quite often all the members of a group do not possess equal skill. In such cases the earnings can be divided proportionately on the basis of their individual time rates or according to specified percentages or in some cases only among certain number of members of the group. In situations where there are unskilled workers and highly skilled workers, the unskilled workers are paid according to their time rates and the skilled workers share the reminder of the earnings among themselves. The size of the group is an important factor in the success of group incentive scheme. Though the size of the group depends on the type of group task, smallest groups are better and more effective.

Thus, the other side of the two-sided employee bonus incentive plan is team or group incentive scheme (GIS) which is easy to implement, cheaper to maintain and beneficial to the management and also to the employees. GIS is particularly useful when the individual incentive plan cannot be applied since there is difficulty in measurement owing to interdependence of operations.

3.2 Advantages of GIS

Team spirit better is the hallmark of GIS. Cooperation and coordination between the team members is built up. With each employee helping the other minor delays and hold ups are reduced. A worker will be more attentive and careful towards his work as he is aware it would help the next man in completing his task. A difficult and complex job will be attended jointly by all the team mates and discipline and responsibility run throughout the group because of the awareness to complete the task qualitatively and speedily. Supervisory effort can be saved because the group leader directs and controls the task. For the newcomer there is not much need for training in GIS since he will be trained and guided by the team mates. Even the performance of the slow and sluggish worker will improve with culture of involvement around him. Absenteeism will be reduced in GIS since an employee is aware that his absence will delay the completion of the job and a consequential reduction in the bonus incentive. Other advantages include reduction in clerical work, maintenance of records and a steady income for the employee.

This article proposes to study the GIS being implemented in the Indian Railway workshop with special reference to the Carriage Repair Workshop (CRW), Tirupati of the South Central Railway where the GIS is being implemented.

3.3 Carriage Repair workshop – Tirupati

Launched on 25th December 1980, Tirupati Carriage Repair Workshop (TCRW) made a beginning with a monthly outturn of 12 coaches in 1986-87 and gradually reached the level of 40 coaches per month in the year 2000-01. The outturn had touched to a level of 60 coaches per month with the introduction of Group Incentive Scheme in January 2002. This was achieved by redeploying existing men. Further, on sanction of additional 390 posts at 135R, the outturn ultimately reached 85 coaches per month since April 2007 and for the current year the revised target is fixed as 90 coaches per month plus supply of IOH bogies to Divisions as per their requirement.

3.4 CRW, Tirupati Activities in brief

Following Table indicates activities of the Tirupati CRW

Table – 3.1: Principle activities of Tirupati Carriage Repair workshop

S.No.	Activity
1	Periodical Over Hauling(POH) of Broad Gauge coaches
2	Refurbishment of Non-AC coaches
3	POH of Power & Trailer cars
4	Supply of overhauled Bogies, wheel sets and Overhauled components
5	Basic Training Centre to impart technical education.

IV. SIGNIFICANCE OF THE STUDY

Improvement of productivity in Indian Railway Workshops is as old as pre-independence days. It needs no emphasis that increased productivity leads to better manpower, plant, machinery and workshop utilization. Before independence piece work bonus incentive plans were implemented in railway workshops like Jamalpur, Kancharapara and Perambur. Each system varied from the other in several ways. After independence, the Railway Board had decided to introduce some incentive system for the employees which would reward workers who exceeded the minimum level with direct financial assistance. Thus the first financial incentive system was introduced in December 1954 in Chittaranjan Locomotive Workshop. This successful scheme was based on time and the standards were fixed after systematic work measurement. It was extended to the Integral Coach Factory in 1960.

A review of the functioning of Railway Repair Workshops revealed very poor standards of performance which could be improved by introducing incentive scheme that would control the activity in a better manner, more systematised flow of work and encourage increased effort by the individual worker. Hence, in 1958 the decision to introduce incentive schemes in the Railway Workshops was taken. However, only after establishing Production Control Organisation in all workshops, the incentive scheme was introduced in 1960 in all the individual Railway Workshops.

Later in the year 1989 the Railway Board undertook a "Review of incentive scheme, Redesign of motivational package/ incentive scheme for maintenance of workshops and production units". For the review a study was conducted by RITES which proposed seven different incentive packages. The Railway Board approved the fourth package which envisaged "Section/shop group incentive scheme based on production norms". The board took into consideration the views of recognized Railway labour unions which were in fact consulted by rites while formulating the proposals. After more deliberations, the board asked rites to further study the implementation of the scheme and come out with a blue print for implementation. RITES prepared a detailed study on group incentive scheme based on production norms which was approved by the board and it is presently being implemented in Tirupati CRW.

V. OBJECTIVE AND HYPOTHESES

This paper proposes to study the wage incentive scheme being implemented in the CarriageRepair Workshop at Tirupati of the South Central Railways. The aim is to suggest methods to improve the existing GIS being implemented there.

Hypotheses: It is proposed to examine in this exercise the following hypotheses with regard to the direct and indirect incentives from standpoint of the Indian Railways in respect of GIS being implemented in CRW Tirupati:

"Motivational value also increases when the timing of the delivery of the rewards is closely approximate the demonstration of a behaviour, the completions of an assignment or the achievement of a result. These elements of motivational theory support the concept that the most powerful short-term incentive is one that relates the individual to the overall performance of the organization. This in no way implies that work unit* or organization-based short-term incentives have little motivational value. It just means that these two basic kinds of incentives are weaker than those relating to the contribution of the individual or those relating to team performance when the individual is a team@ member14."

[*Work unit in this context is a unit consisting of a number of employees comprising more than a team. Different operations are performed in the work unit, but criteria are available for rating the performance of the identified work unit. @A team is alimited number of employees preferably not more than 11 or 12 working together to perform well-defined activities and achieve specific results.]

VI. RESEARCH METHODOLOGY

This study used primary and secondary data to assess the impact of GIS on the employees of Lallaguda workshop. The primary data comprises of actual verification of the work done by the research scholar. The secondary data is obtained by way of available literature on Indian Railways and CRW, Tirupati workshop and also literature on compensation management.

6.1 Features of Group Incentive Scheme (GIS)[15] in the Indian railways

- The coverage under the Incentive Scheme will be limited to the defined Incentive Production Groups, Support Shops Incentive Group and Support Departments Incentive Groups.
- The Authorised Manpower Strength for each Incentive Production Group will be derived from the management approved Annual Production Plan.
- The monthly targets for each month for each Incentive Production group are kept directly proportional to schedule number of working days in the month.
- Idle time booking is permitted only in the event of failure of external power supply, when it exceeds 60 minutes at a stretch for each occurrence in the month. Idle time booking on no other account is permissible.
- All the on-roll members of the group from unskilled level up to SSE level are included as members of the group and eligible for computed incentive payment.
- Group wise performance is determined from physical dispatches made by supplying group and accounted for as received by receiving group. All the different products dispatched are converted to standard Production Units to get a common accounting unit.
- The "No Bonus Limit" is the group Output which is 0.75 of Group Production Norm.
- A coach Users Defect Reports Scheme has been incorporated which adversely effects the accountable dispatches when defect reports on Tirupati Workshop turned out coaches are received by the workshop.
- Excessive detention of coaches in individual shops and plant as whole attract negative effect on group performance.
- Defects on Products dispatched by supplying group to receiving group caused adverse effect on supplying group incentive performance.
- Effect of Plant Production Index (PPI) for total plant performance gets included in group incentive earning calculations.
- Any time spent away from the individual's work place adversely affects the concerned individual member incentive earning.
- Overtime booking though permitted causes adverse effect on group performance and also individual member earnings.
- Individual member incentive earning is directly proportional to member's own clocked in hours during the month.
- To assist in getting better attendance at work by group members a group Attendance Factor is included in the scheme.
- Different grades of incentive covered staff have defined Incentive Earning Factor as will be approved by Railway Board. Incentive amount payable to individual members is derived using the applicable. Incentive Earning Factor in accordance with scheme formulae.
- There is a limit of 50% on Incentive Earnings in a calendar month period under the scheme.
- The Gross Production Index (GPI) for any Incentive Production Group gives a Weightage of 0.7 for Group Production Index (PI) and of 0.3 for Plant Production Index (PPI).

- The Support Shops Incentive Group has been given a Support Shops Incentive Linkage constant of 0.80 and support departments at 0.50.
- Required adjustment of group on-roll strength can be done freely by needed inter-group manpower adjustments on workload considerations at any time during the month.
- Coaches output accountal will be done coach type wise only and not by category of repairs executed.
- The accounting period under scheme is applicable calendar month.
- The basic principle of self-inspection by workshops has been built in and requisite done in this direction are duly accounted for.
- Whenever any product is found to have defects as determined by receiving group, then any man-hours deployed to remove the defects by receiving group flow back to supplying group based on reports made by receiving group. This has the effect of increasing the workload on supplying group thus giving an inbuilt mechanism against making defective product supply by supplying group.
- The present system of NTXR(Neutral Train Examiner) examination before coach dispatch is retained.
- A Coach Users Defect Points scheme has been incorporated. The effect of Defect Reports is to deduct coaches for per 50 points of accumulated defects.
- In the event any coach turned out from Tirupati Shop after repairs is detached within 3 months en-route when in service then heavy back flow of penalty points is envisaged. This will help for increasing awareness in shop to minimize defects in coaches being turned out from Tirupati Workshop.
- Detaching of repaired coaches to Sick Lines while in service will attract negative penalty points.
- Incentive Bonus to the employees is calculated with the help of the following formulae:

Table – 6.1: Incentive formulae for production shops of CRW Tirupati

Sl. No.	TERMS	FORMULA
1	Staff @135R for 85 coaches + 60 IOH Bogies	1020 eGSCN sanctioned Manpower
2	Actual staff strength	Available staff (Excluding long absent)
3	Group standard monthly target	(Yearly Target of Coaches & IOH bogies x No. of working days in a month) / (No. of working days in a year)
4	Standard Man hours	Leave Reserve x sanctioned strength x Working hours in a month *Leave Reserve = 100-12.5 = 87.5 / 100 = 0.875
5	Actual clocked in hours	GA card punching hours from Time office
6	Rectification Man hours	Reworks booked from shops
7	Group Attendance Factor	Actual clocked in hours / (Leave Reserve x Actual staff strength x Working hours in a month)
8	Outsourced Booking hours	Contract man power booked
9	Available Man hours	Actual clocked in hours + (3 x Rectification Man hours)
10	Group production Norm	(Group standard monthly target x Available Man hours) / Standard man hours
11	Group Base output	0.7778* x Group Production Norm *(100 / 135) x 1.05
12	Group Eligible Dispatches	Group Dispatched coaches in SPUs
13	Group Coach Holding Factor	Target holding days / Actual detention days
14	Group Production Index (GPI)	(Group Eligible Dispatches x Group Attendance Factor x Coach Holding Factor) / Group Base output
15	Plant Eligible Dispatches	CRS to Traffic Dispatched coaches in SPUs
16	Plant production Index (PPI)	(Applicable Weightage Factor x Plant Eligible Dispatch) / Group Base output
17	Gross Production Index	70% of GPI + 30% of PPI

Similarly, there are other formulae to calculate incentive bonus for the employees in other three shops.

6.2 Regrouped categories under GIS in CRW Tirupati

GIS is now being implemented in four of the five categories of incentive production groups. The work activity that was carried out formerly in the 27 work centers were regrouped into four categories as under:

6.2.1 Production shop category:

These include shops of the plant where production activities are going on that directly contributes to the manufacturing and output of various products.

6.2.2 Support shop category:
These shops carry out activities which assist the production activity that are essentially require for the work in different production shops.

6.2.3 Support department category:
These comprise of departments of the plant where work activities indirectly support the production activities in the shop however their output performance cannot be physically verified.

6.2.4 Service department category:
These are the departments sections and shops that would contribute for the plant management work completion but they do not come under the preview of the incentive scheme. For the year 2018-19 the outturn targets approved by the zonal headquarters are given in the table below:

Table – 6.2: outturn targets during the year 2018- 2019 for incentive calculations

Parameter	Carriage Fitting(CF)	Carriage Body Repair(CBR)	Paint (PNT)	Wheel shop (WHS)	Train Lighting shop (TLS)
Target / Month	85.000	85.000	85.000	85 x 4 = 340	85.000
Target / Year	85 x 12 = 1020	85 x 12 = 1020	85 x 12 = 1020	340 x 12 + 1000 = 5080.000	85 x 12 = 1020
IOH[6] Bogie / Year	60 x 0.182 x12 =131.04	0.000	0.000	60 x 2 0.75 x 12 = 1080	60/2 x 0.089 x12 = 32.04
AC[7] Coaches	(1.036-1) x 108 = 3.888	(1.245-1) x 108 = 26.46	(1.283-1) x 108 = 30.564	0.000	(2.996-1) x 108 = 215.568
Total / Year	1020 + 131.04 + 3.888 = 1154.928	1020 + 26.46 = 1046.46	1020 + 30.564 = 1050.564	5080 + 1080 = 6160	1020 + 32.04 + 215.568 = 1267.608
	1154.928	1046.460	1050.564	6160.000	1267.608

6.3 GIS bonus incentive scheme in Production shop category
In this studythe application GIS bonus incentive scheme will be elaborated in respect Productionshopcategory to illustrate the operation of the scheme. Before that we have to understand certain formulae with regard to the application of the GIS. In respect of Productionshopcategory the following formulae are useful to calculate the bonus to the shop and its groups:

Table – 6.3: Incentive Formulae for Production Shops

Sl. No.	Parameter	Formula
1	Staff @135R for 85 coaches +60 IOH Bogies	1020 eGSCN sanctioned Manpower
2	Actual staff strength	Available staff (Excluding long absent)
3	[1]GSMT	(Yearly Target of Coaches & IOH bogies x No. of working days in a month) / No. of working days in a year
4	[4]SMH	Leave Reserve (LR) $\times$ sanctioned strength x Working hours in a month *LR = 100 – 12.5 = 87.5 / 100 = 0.875
5	Actual clocked in hours	Gate Attendance card punching hours from Time office
6	Rectification Man hours	Reworks booked from shops
7	[2]GAF	$$\frac{Actual\ clocked\ in\ man\ hours}{LR \times Actual\ staff\ strength \times Working\ hours\ in\ a\ month}$$
8	Outsourced Booking hours	Contract man power booked
9	[5]AMH	Actual clocked in hours + (3 x Rectification Man hours)
10	Group Production Norm(GPN)	$$\frac{GSMT \times AMH}{SMH}$$
11	Group Base Output(GBO)	0.7778* x Group Production Norm (See S. No. 10 above) *$\frac{100}{135}$* 1.05
12	Group Eligible Dispatches	Group Dispatched coaches in SPUs
13	Group [3]CHF	Target holding days/Actual detention days
14	Group Production Index (GPI)	(Group Eligible Dispatches $\times$ GAF$\times$ CHF) / GBO

15	Plant Eligible Dispatches	CRS to Traffic Dispatched coaches in SPUs
16	Plant production Index (PPI)	$$\dfrac{\text{Applicable Weightage Factor} \times \text{Plant Eligible Dispatch}}{\text{GBO}}$$
17	Gross Production Index(GPI)	70% of GPI + 30% of PPI (See S. No. 16 above)
	[1]GSMT= Group Standard Monthly Target, [2]GAF= Group Attendance Factor, [3] CHF= Coach Holding Factor, [4]SMH= Standard Man Hours, [5]AMH= Available Man Hours,	

Similarly, there are different formulae for support and support department category shops which are not mentioned here for constraint of space.

The incentive earning of individual member belonging to production shops can be calculated easily with the help of a formula given below:

$$\frac{(\text{Gross production index}-1) \times \text{Applicable incentive factor (Bonus factor)} \times \text{clocked hors by the member}}{\text{scheduled working hours} \times \text{Quality linkage factor}} \qquad (6.1)$$

6.4 Incentive Calculations of Production Shops

The calculations for the incentive received by the employees of the Carriage Fitting Shop during the month of May 2018 are studied and discussed below. In May 2018 there are 27 working days and total 217.5 working Hours. The standard manpower sanction is 294 and actual available manpower is 264 employees.

6.4.1 Yearly target of POH coaches and IOH bogies:

Coach target per year = 1020 coaches and IOH of bogie per month = 60 bogies
Bogies conversion factor = 0.182;
IOH bogie per year = 60 x 12 x 0.182 = 131.040;
AC coach conversion factor = 1.036;
AC coach for the year = 108; AC coach = (1.036 – 1) x 108 = 3.888
Yearly target of POH coaches and IOH bogies = 1020 + 131.040 + 3.888 = 1154.9

6.4.2 Staff @135R for 85 coaches +60 IOH Bogies = 1020 eGSCN sanctioned Manpower= 294

6.4.3 Actual Staff Strength = Available staff (Excluding long absentees)= 264

6.4.4 Group Standard Monthly Target

$$= \frac{\text{yearly target of coaches and IOH bogies} \times \text{number of working days in the month of May}}{\text{No of working days in a year}}$$

$$= 1154.928 \times \frac{27}{297} = 104.99345$$

6.4.5 Standard Man hours

= LR x Sanctioned strength of CF shop x Working hours in May 2018

= 0.875 x 294 x 217.5 = 55951.875 Hrs where LR = $100 - \frac{12.5}{100} = 0.875$

Actual clocked in hours = GA card punching from time office = 50037.57 Hrs
Rectification Man hours = Rework booked from shop = 129.50 Hrs.

6.4.6 Group attendance factor

$$= \frac{\text{Actual clocked in Hours}}{\text{LR x Actual staff strength x working hours in May 2018}}$$

$$= \frac{50037.57}{(0.875 \text{ x } 264 \text{ x } 217.5)} = \mathbf{0.99592}$$

6.4.7 Outsourced Booking Hours = Contract manpower booked = 11463.64 Hrs

6.4.8 AMH

= Actual clocked in Hours + Outsourced booking Hours + (3 Rectification Man Hours)

= 50037.57 + 11463.64 + (3 × 129.50) = 61889.71 Hrs

6.4.9 Group Production Norm (GPN)

$$= \frac{GSMT \times AMH}{SMH} = \frac{104.99345 \times 61889.71}{55951.875} = \mathbf{116.13577}$$

6.4.10 Group Base Output

= GPN x factor for zero incentive factor for zero incentive

$$= \left(\frac{100}{135}\right) \times 1.05 = 0.77778 = 116.13577 \times 0.77778 = 90.32808$$

6.4.11 Group Eligible Dispatch = Group Dispatched coaches in SPUs = 135.809

6.4.12 Group CHF $= \frac{\text{Target holding days}}{\text{Actual detention days}} = 1$

6.4.13 Group Production Index (GPI)

$$= \frac{GED \times GAF \times CHF}{GBO}$$

Where,

         GED= Group Eligible Dispatches,

         GAF= Group Attendance Factor,

         CHF= Coach Holding Factor,

         GBO= Group Base Output

$$= \frac{(135.809 \times 0.99592 \times 1)}{90.32808} = 1.49737$$

6.4.14 Plant Eligible Dispatches = CRS to Traffic Dispatched Coaches in SPUs = 137.797

6.4.15 Plant Production Index (PPI)

$$= \frac{\sum(\textbf{Applicable weightage factor} \times \textbf{Plant Eligible dispatches}}{\textbf{Group base output of all production shops}}$$

6.4.16 Applicable Weightage Factor:

$$= \sum(\textbf{Man hours for GSCN coach} \times \textbf{Group standard monthly target })\text{for all production shops}$$

$$= 546.3 \times 104.9 + 1183.8 \times 95.1 + 318.7 \times 95.5 + 32.3 \times 560 + 313.8 \times 115.23 = 254674.722$$

Applicable Weightage Factor (AWF) of CF Shop $= \frac{57538.972}{254674.722} = 0.22522$

Similarly, AWF of CBR Shop is 0.4441 and Paint shop is 0.11954, wheel shop is 0.07102 and Train lighting shop is 0.14201.

Plant Production Index (PPI) $= \frac{(0.22522 \times 137.797)}{90.32808} + \frac{(0.44221 \times 110.4802)}{690.06879} + \frac{(0.11954 \times 107.141)}{723.3679} + \frac{(0.07102 \times 723.076)}{514.41805} + \frac{(0.14201 \times 131.308)}{93.28745}$

$$= 1.52552$$

6.4.16 Gross Production Index

= 70% of GPI + 30% of PPI= $(0.7 \times 1.49737) + (0.3 \times 1.52552) = 1.499$

6.4.17 Individual Incentive earning of an employee:

$= (GPI - 1) \times$Applicable IEF $\times \frac{\text{clocked in hours by employee}}{\text{Schedule working hours}} \times QLF$

Where,

      IEF= Incentive Earning Factor,

     GPI= Gross Production Index,

    QLF = Quality Linkage Factor

6.4.18 Quality Linkage Factor:

     Q1 = 1   (since all coaches are NTXR certified)

     Q2 = 0.95   (Sick Marking within 100 days, CRS Average 2016 – 17 = 0.16; Global Average 2016 – 17 = 1,

                     CRS Average April 2018 = 0.26; CRS Average for April 2018 is better than Global Average but not

better than CRS average for 2016 – 17; Hence Q2 = 0.95 for Artisans = 0.90 for Supervisors)

Q3 = 1   (since no En-route coach was detached)

Quality Linkage Factor $Q = \dfrac{(Q_1 + Q_2 + Q_3)}{3}$

$$= \dfrac{1 + 0.95 + 1)}{3}$$

= 0.98333 for Artisans

$$= \dfrac{(1 + 0.90 + 1)}{3} = 0.96667 \text{ for SSE}$$

Q = 0.98333 artisans, and 0.96667 For SSE

Where, CRS= Carriage Repair Shop

Table – 6.4: Applicable Incentive Earning Factor

Sl. No.	Designation	Value
1	Junior Engineer (JE) /Sr. Technician	13440
2	Technician – I	11700
3	Technician – II	10400
4	Technician – III	7930
5	Helper	6760

Table – 6: Incentive Bonus Earned By Seven Employees during May 2018

S.No	Name & Designation	Designation	Incentive earned Rs.in May 2018	Basic pay in Rs.	Percentage of Basic pay
1	C. Dhananjay	Senior Section Engineer (SSE)	2678/-	19180	14 (approx)
2	Chatla	JE	5651/-	13440	42
3	N. Ashok Kumar	Sr. Technician	6350/-	13440	47
4	M. Sarath Babu	Technician I	1834/-	11700	33
5	P. Raj Shekhar	Technician II	1834/-	10400	18
6	Dhanunjay Kumar	Technician I	3433/-	7930	43
7	Dharmendra Kumar	Helper	3324/-	6760	49

Table- 7: Incentive Bonus Calculations for the Above Employees During May 2018

S.No	Name & Designation	Basic pay in Rs.	Hours worked	Incentive earned Rs. in May 2018
1	C. Dhananjay	19180		Absent for one day. His basic pay will be taken for 26 days as working days in a month is 27 15% of basic pay excluding absent days × Quality linkage factor $= \dfrac{0.15 \times (19180 \times 26) \times 0.9667}{27} = \text{Rs } 2678/\text{-}$
2	Chatla	13440	186	Similarly 5651/-
3	N. Ashok Kumar	13440	209	6350/-
4	M. Sarath Babu	11700	146.5	1834/-
5	P. Raj Shekhar	10400	78	1834/-
6	Dhanunjay Kumar	7930	191.5	3433/-
7	Dharmendra Kumar	6760	217.5	3324/-

VII. RESULT AND DISCUSSION

GIS is a win-win scheme since it offers a win-win environment to the management and to the employees. On the one side it saves on production costs and on the other it rewards the employee for his hard work and extra effort. For the employee sea is the limit to earn as much bonus incentive within the prescribed norms, since there is no ceiling limit on maximum bonus earnings. For

the management it saves costs of supervision and paper work besides ensuring maximum employee attendance. The following table based on the data of GIS in CRW Tirupati reveals the advantages and disadvantages of the scheme:

Table – 7.1: Performance of CRW Tirupati Between 2006 To 2017

S.NO	Parameter	Measure	Performance (Year)	Performance in 2017
1	Cycle time (AC)	days	15.63 (2015)	11.96
2	Cycle time (Non-AC)	days	13.43(2015)	6.39
3	Cycle time in days	days	13.86 (2015)	6.42
4	Manpower ratio	Ratio	0.86 (2015)	0.90
5	Incentive earned	Total Rupees	2,67,12,210 (2006)	6,06,03,261
6	Incentive %	Percentage	48.646 (2006)	43.841
7	Idle time booked	Hoursand days	Nil-(2006)	Nil
8	Incentive deducted due to Quality Linkage Factor	Total Rupees	1,12,794 (2006)	7,07,986
9	Incentive deducted due to failure 100 days	Total Rupees	3,50,526 (2006)	2,20,386
10	Rework	Hours in the year	69,720 (2008)	3,929
11	Average Group Attendance Factor		0.9969 (2008)	0.9932
12	Load Lifted	Manhours for the year	25,74818 (2008)	29,9480
13	Coach Holding Factor	1 (2006)		1
14	Average men in IED	Number	17 (2006)	19
15	Average unit cost of POH	Total Rupees	11,03,111 (2014)	13,00,250
16	Overtime Booked	Hours in the year	-Nil- (2006)	Nil
17	Coaches not taken Into account due to excess POH	Number	-Nil-(2006)	Nil
18	Corrosion outturn	Number of coaches	115 (2006)	291
19	Yearly out-turn including AC bogies	Number	961 (2006)	1180
20	Yearly out-turn of AC bogies	Number	50 (2006)	121
21	Average actual manpower available including IED staff	Number	1159 (2006)	1287

A close look at the above data offers the following revelations about the GIS in CRW, Tirupati".

1. There is appreciable growth in the cycle time of carriages in the workshop. Cycle time the average time carriage spends in the workshop that is the difference between the dates the carriage leaves the workshop after the completion of repairs minus the date on which it was brought to the workshop. Over the years the cycle time has been coming down ever since the GIS was introduced in the workshop. The cycle time for the total number of carriages including AC has come down by more than 50% from 13.86 days in 2006 to 6.42 days in 2017. Similarly, in the case of non-AC bogies also the cycle time has come down by more than 50% from 13.439 to 6.396 days. It may be noted that repair and servicing of no-AC bogies require lesser time than AC coaches which taker longer time as the parameters of servicing and checking are more. It may be noted that the number of days in cycle time with regard to AC coaches is also coming down from 15.63 days in 2015 to 11.96 days in 2017. Hence, it can be reasonably concluded that GIS is instrumental in increasing the turnover of the carriages in the Tirupati workshop.

2. Ever since the GIS was introduced in the Tirupati workshop in 2006 there is no idle time for the workers. This indicates that the employees are immersed totally in their work and are not idling away their time.

3. A commending feature is the reduction in instances of failure of repairs just within 100 days of repair. The same is the case with regard to hours of rework. In GIS there is penalization by way of deducting certain amounts from the employees if the carriage they repaired fails to perform and breaks down and needs re-repairs. While Rs. 3.50 lakhs was deducted in 2006 from the employees for failure of repairs they have carried out, in 2017 this has come down to 2.20 lakhs more than one-third of the penalty amount of 2006. This improved performance is in spite of more number of carriages, to the extent of 50% more, were repaired in 2017 than in 2006.

4. The rework time also has come drastically to the extent of 1760 percent in 2017 than in 2008. While in 2008 the total number of hours of rework was 69,720 it was just 3,939 hours in 2017. Rework is the time employees spend on re-repairing an earlier repair work which has failed to function.

5. GIS has totally wiped out the overtime payment for employees. Similarly, if there is excess of periodical overhauling of coaches they will not be counted for payment of incentive bonus under GIS. After the introduction of GIS there was not a single instance of repaired coaches not being taken into account on grounds of excess of periodical overhauling.

6. The corrosion out-turn and yearly out-turn of AC coaches have registered appreciable increase ever since GIS came into practice. In 2006 while 115 coaches repaired for corrosion it has gone up to 291 in 2017, an increase of over 250 percent. So also the number of AC coaches repaired which were only 50 in 2006, has gone up to 121 in 2017, an increase of 120 percent.

7. The yearly out-turn of the repaired coaches of the workshop has increased by nearly 23 percent from 961coaches in 2006 to 1180 in 2017.

8. There is an increase in incentive amount from 2006; it has gone up from 2.67 Crores to 6.06 Crores. This implies that the repair work has increased and also the turnover has registered an appreciable rise of 23 %. Naturally this calls for increase spending on bonus. Similarly, there is increase in manpower ratio which also indicates the increase in the repair work in the workshop. However, it can be noticed that the percentage of bonus incentive amount has shown a reduction of 5.2 point over that of 2006. This in spite of increase in workload as mentioned above. Hence it can be deduced that there is increase in workload which is supported by the load lifted, but there is reduction in bonus paid which implies more work being done in the workshop than the base year.

9. A look at the incentive amounts earned in the month of May 2018 by seven employees (see table-6) above shows that the employees have earned bonus ranging from 18 to 49% of their basic pay as incentive bonus. It may be noted that employees with lower basic have earned from 33 % to 49% which means they are eager in utilizing the scheme. Only one employee has earned 18% since he has worked less may be because of some personal reasons. The SSE has earned only 14% since there is ceiling on his bonus earnings. Overall it can be concluded that employees are utilizing the scheme and earning above 40% as incentive bonus which means the scheme has gone well with them.

10. In the interactions with the beneficiary employees it was expressed that GIS is more employee friendly since there is less of supervision in spite of quality control factors. Further employees were happy that there is less documentation work in the programme and there is more freedom in executing their jobs of course with in the frame work of quality control.

11. All employees wanted the bonus limit of 50% should be removed which will induce them to work more so as to earn more. The present 50% ceiling is acting as a mental barrier and they are stopping at 47 to 49% because of the ceiling they say that if the ceiling is removed their earnings will go above 60 or 70% in all probability.

VIII. FINDINGS AND RECOMMENDATIONS

1. Overall the employees of Carriage workshop Tirupati are happy with the incentive scheme and many of them utilizing the benefit of extra earning which is supported by the fact that the incentive bill for 2017 is around Rs 6 Crores.

2. GIS is a win- win programme. It is benefitting the employees by way of additional income. For the railways also it is useful because this turnover is more with less supervision and lesser documentation. The monitoring can be made easy with GIS.

3. The employees are working hard due to GIS which is supported by the fact that there is no idle time booked.

4. The output is increased because the cycle time of holding the coach in the workshop has come down by nearly 50%.

5. The quality of work also has gone up with decrease in number of repaired coaches subjected to rework and failure below 100 days has come down drastically.

6. There is urgent need to remove the ceiling limit of 50% on maximum incentive bonus because employees want to work more and earn more.

7. It is suggested that the ceiling limit of 15% incentive bonus to supervisors may be removed so as to enthuse them about the work and the scheme. That would motivate them to involve themselves on equal footing with the employees who are earning up to 50% bonus.

8. It is ideal to remove all ceiling limits in the GIS because it is economical to the management and also it would be fetching to the employees.

9. Self-supervision is the hallmark of GIS. The responsibility of completing the task in time, maintaining quality and ensuring attendance rests on the group. The group members are aware that failure in any aspect will attract penalties. So the group itself enforces discipline and ensures attendance. Even new comers are trained by fellow employees and shortfalls among colleagues are made up by each other. A spirit of camaraderie thus takes root among the members of the group.

IX. CONCLUSION

It was said that the most powerful short-term incentive is one which relates the individual to the overall performance of the organisation. This is proved with the help of GIS being implemented in the carriage repair workshop at Tirupati. The overall performance of the workshop over the last 12 years has been improving remarkably year by year and the working levels also are looking up as indicated by the data depicted in the study. The employees besides expressing happiness with the GIS wanted the ceiling limits on bonus to be removed. There is no doubt if this is done the performance of Tirupati workshop would increase substantially. Hence this study besides supporting the hypothesis suggests certain improvements in GIS by way of lifting the ceiling limit on incentive bonus. The study also supports that GIS offers a win- win environment for the management and the employees.

However, the supervisors which are segregated from the group are not being adequately incentivised. This is supported by the incentive to SSEs in Tirupati workshops who receive very lesser incentive of 15% whereas the employees he monitor earns anywhere around 30 to 49%. Hence the ceiling limit on bonus for the SSEs also should be removed to involve more and more with

the employees he supervises. At the same time to maintain quality and standards the quality linkage factors which are being applied to the employees now should be made applicable to the supervisors also.

This study on GIS in the Indian railway is the first of its kind though the scheme was introduced more than a decade and half ago. It is hoped more research and in-depth studies will follow this maiden effort so that further suggestions and findings about the scheme will emerge for the consideration of the railway administration to fine tune the scheme.

REFERENCES

[1] Martocchio, Joseph J. *Strategic Compensation.* 7th ed. Pearson. Dorling Kindersley India Pvt. Ltd., New Delhi, 2014.

[2] Jackson, S.E. "Team Compositionin organizational savings – Issues in managing an increasingly diverse workforce." *Group process and Productivity* (pp. 138-173) S. Worchel, W. Wood & J.A. Simpson (Eds.) CA: Sage, Newbury Park, 1992.

[3] Kanter, R.M. "When a thousand flowers bloom: Structural, collective and social condition for innovation in organization", *Research in organizational Behaviour* (Vol.10, PP. 169-211), CT: JAI, Greenwich, 1988.

[4] Worchel, S. Wood, w., & Simpson, J.A. (eds.). Group Process and Productivity. CA: Sage, Newbury Park, 1992.

[5] Kanim – Lowers, J & Camerson, M. "Team based reward systems", Journal of compensation and Benefits. January to February 1993, pp. 55-60.

[6] Schuster, J.R. & Zingheim, P.K. "Building pay environment to facilitate high performance teams", ACA Journal 2, 1999, pp.46-51.

[7] Greene, R.J. "Team Incentives". Incentive Pay : Creating a Competitive Advantage. D.Scott (ed.), Phoenix, AZ: World work Press, 2007.

[8] Belcher, J.G., Jr. "Gainsharing and variable pay" The state of the art". Compensation and Benefits Review. May-June, 1994, PP 50-60.

[9] Doyle, R.J. Gain sharing and productivity. American Management Associations, New York, 1983.

[10] Milkovich, G.T.& Newmen, J.M. Compensation. (4th ed) IL: Irwin, Homewood, 1993.

[11] Lesivr, T.G. (ed). The Scanlon Plan : A Frontier in Labour Management cooperation. MA: MIT Press, Cambridge, 1958.

[12] Myers, D.W. Compensation Management. IL: Commerce clearing House, Chicago, 1989.

[13] Indian Railways Statistical Publications 2016-17 Ministry of Railways, Railway Board, New Delhi.

[14] Henderson, Richard I. Compensation Management in a Knowledge-Based World", Pearson. Dorlington Kinderseley (India) Pvt. Ltd., New Delhi, 2013.

[15] RITES (A Government of India Entrprise). Implementation of Redesigned Incentive Scheme at Tirupati Coach Repair Workshop of South Central Railway, Main Report. Ministry of Railways, New Delhi, June 2000.