

Change Management on Improvement Project for Success

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Abstract— A success of an improvement project on solving a problem in an organization is not only depending an appropriate methodology on problem solving with Lean, TOC or 6 sigma with relevant tools, but also it is very important to have an appropriate methodology and process on change management integrated with project management during the improvement project. This paper describes the principle of change management based on existing literature, and illustrates a case study on how an improvement project apply theory and methodology of change management to make successful change. Firstly, the literature review relevant to concerns for support change in a business environment is introduced. General tools, models, and solutions to make a change effectively in an organization are explained. Next one framework with relevant tools and models are selected to the case study that conducts a manufacturing with ETO (Engineering-to-order) product. Next regarding the readiness for change, and the implementation of the change the paper introduces how the selected framework and the tools and models on change management is integrated with project management during different phases of the improvement project. As a result, it shows a success both from improvement project and change management perspective. In particular, achievement in the change management is not only showing the successful improvement project, but also the organization realizes another great positive change - people's improved behavior on daily work. Hence a long-term benefit from the improvement project and change management is gained. The achievement shows that similar approach on change management in an organization may be applied to more organizations.

Keywords—Change management, improvement project, processes, communication, behaviors

I. INTRODUCTION

Nowadays, in order to keep staying at a position from a changeable business environment continuously, an organizations must try to keep making changes for improvement, for instance, changing in organization structure, relevant processes, technologies, even human resources using to new business environment and conditions [1-8]. Consequently, changing in the organization must face with numbers of challenges, even though, an organization has to keep making changes driven by many reasons, for instance: driver from current market conditions, and business' competitors. Especially, when business growth and profitability are at a premium during changing, it is a need to accelerate positive change in the organization, it makes changing is becoming even more critical [7-9].

Regarding a definition of change management is explained by Prosci as below:

It is the application of a structured process and set of tools for leading the people side of change to achieve a desired outcome.

The Goal of Change: Improving an Organization by Altering How Work Is Done

In terms of change management, a numbers of approaches, tools, models have been developed and published to enhance business performance [1, 8-12] by changing in the past years, among them, some of tool or approach with its tips have been widely used for change management. However, the success stories of change have been still limited, compared with failure to meet expectations [1, 6, 13-16], a correct methodology is one most critical success factor for change management. Therefore, in order to achieve a success from changing, it is a key to select an appropriate methodology and tools, and use in an appropriate way to meet business environment. This paper

presents that an improvement project integrates with change management through selected methodology and tools for during the project to ensure a success. The framework for change management with relevant tools shows a great impact on implementing and sustaining change.

This paper firstly reviews principles of change management. It shows that the change management needs an appropriate methodologies and tools in order to gain a success. Next it describes some relevant methodologies, models and tools for changing. Following a literature review and a discussion related to popular system or methodology for problem solving are reviewed, it points that an improvement project or program requires an appropriate methodology of change management integrating with the project management for problem solving project in order to gain a success. It states a strong reason that an applicable framework for change management needs to be integrated with organization change. Then there is an analogy to a case study carrying with an improvement project in a manufacturing uses the selected framework with relevant tools for change management through an improvement project for problem solving. It describes a process of project management based on Lean methodology for problem solving, and how the framework and necessary tools are embedded to several phases of project implementing. Based on a result from case study, relevance performance of improvement project are presented, it shows that the achievements from change management provides not only a buy-in for the changes through improvement project, and gained changes, but also the organization realizes another great positive change - people's improved behavior on daily work. Hence a long-term benefit from the change management is gained. Finally, some conclusions and suggestions for further research works are presented.

II. METHODOLOGY AND TOOLS FOR IMPLEMENTATION OF CHANGE IN ORGANIZATION

A. Brief Literature Review on Change Management

In the past years, since more and more needs have brought interests to academic people, consultants and practitioners to develop methodologies, tools regarding change management. Some of them has been adopted for a change in organizations and a benefit might be made in some of organizations. However, most organizations have gained less benefit from implementing change. In fact, it is not easy to make changing, one estimation based on a survey of more than 400 large and complex organizations, has shown that 90% of change programmes have faced major difficulties in implementation of change, it means that the success level is as low as 10%, moreover, only there is one-third expected to deliver measurable business improvements [1, 17]. Another proof from Michael Beer and Nitin Nohria's book in 2000 [6] "Breaking the Code of Change", it points that nearly two-thirds of all change efforts fail. Since the difficulties of changing, more practical frameworks, tools and models with tips have been developed to support changing of organization. Consequently, there are relevant methodologies, tools and process models regarding change management proposed in literature. Here presents a brief literature survey of certain

methodologies, models on the basis of the framework, tools and process with its elements in terms of change management.

Among a number of practicing and developer of change management, here, we summarize the main findings presented in the literature. The selected references highlight significant contributions but are not meant to be exclusive. One important source is from Prosci [8], who is the world leader in benchmarking research and change management products provides its tools and methodology—based on best practices research with over 3400 international organizations. It has made and collected numbers of resources for the relevant subjects, including books, articles, tutorials, benchmarking and even organizes more training.

Regarding crucial points to make a success of change management, in 1995 John Kotter who is a professor working at Harvard Business School and world-renowned change expert, introduced his eight-step change process in his book-"Leading Change." [16], which is called as "Kotter's 8-Step Change Model".

Besides above professors or consulting company, there are more researchers have done great work as well, such as Peter Senge [12], J S Oakland and Tanner [1], etc. J S Oakland and Tanner, based on the review on a relevant research and publications, including previous outcomes from John Kotter, Michael Beer & Nitin Nohria, Peter Senge, and a further research on successful changing, have summarized below four main key points [1]:

- Leadership has a key role to play, both in setting direction, inspiring change throughout the organization and ensuring that change is implemented. This topic is involved many authors, such as John Kotter, Peter Senge, and Beer & Nohria. Among these authors, Beer & Nohria's article "Cracking the code of change" [7] on Harvard Business Review has proposed that a leadership is important for the changing management. This points is corresponding to case study that will described in later section.
- Related to leadership, Oakland and Tanner pointed a need to identify and define the change that is required. This is often linked to financial pressure. They pointed that a project management approach is the most successful approach when implementing such change, with the definition of clear success measures being important.
- Managing change also has its softer side. They noted that people are the essential contributor to successful change. This is correspond to a case study- people's behavior, culture and good communication are also one of crucial point according to the research.
- Learning is one of the important point during changing, it is a fact that once the change has been completed, organizations also capture the learning, both at a project and at an organizational level.

This has been proved in many successful changes and case study in this research.

Regarding team development during changing, as a team plays an important role during changing, Dr. Bruce Tuckman has developed a theory of team dynamic teams: Tuckman

Model [18-20]. According to Tuckman, team development should go through the stages as they work together, the work effectiveness differs in different stages. In some stages there is a high risk for team failure. Teams can get stuck in a stage, and the teamwork output may stop. The stages of Tuckman model are as below: Forming; Storming; Norming; Performing and Adjourning.

Tuckman's model explains that as the team develops maturity and ability, relationships establish, and the leader changes leadership style. In this model, the team dynamics for small teams is covered. We have used for the improvement project that illustrates on next section in this paper.

Regarding individuals in order to good cooperating during changing, people's behavior is another important topic for successful change management. All of the activities on improvement drive individuals' behaviors. In an improvement project for changing, all improved process in which people will operate, the new structure, roles, competencies and resources utilized, along with the performance measures and process controls being implemented, all these must drive new behaviors. It is a key for people to understand that a natural changing of people's attitude during change management, then the necessary communication, both formal and informal, with teams as can be taken to help them develop positive attitudes and behaviors for the new process. A change management cycle model is first introduced by Swiss psychiatrist Elisabeth Kübler-Ross in her 1969 book. Even though Elisabeth Kübler-Ross originally adopted the model to people suffering from terminal illness [21], later to any form of catastrophic personal loss (job, income, freedom). However, the cycle has been widely accepted as a model for describing the key stages in managing business change and is used in many organizations to raise awareness of how people may react and what to do as a consequence. According to the change management cycle from people's reaction, people will go through denial, anger, bargaining, depression, and eventual acceptance. During an improvement project, when obstacles from teams' attitudes to implementation of change, the management should understand that this stages are normal and all these will be worked through and the ultimate stage of "commitment" and acceptance will be reached.

In order to change successfully, besides necessary theory and tools, CSF (certain critical success factors) are also important. There are many factors help deliver successful change, according to a brief category from J S Oakland and Tanner [1], there are certain CSF (critical success factors) for the change management as below: Project champion; Management commitment; Project management; Natural work team process; Use of consultants.

Under above category of CSF, a change management in various organization can also define and extend more CSF based on the specific situation.

B. Common Improvement Methodologies for Problem Solving

As mentioned in last section, the survey shows that the change is not easy whatever the reasons of changings is. Many companies or businesses has realized how important the change is due to some different reasons, one of the reason is

that improvement on process for problem solving. In general, the company is able to use some of the common tools for problem solving methodologies like Lean, Six-Sigma, TOC (Theory of Constrains), PDCA (Plan-Do-Check-Act), and even TLS (TOC + lean + six sigma) for guiding the process changing. However, these methodology just focuses on how to make problem solving in terms of process issues, it doesn't involve an appropriate methodology of change management. Here, a brief introduction on these problem solving methodologies is reviewed.

In terms of Lean methodology, in order to eliminate wastes from the process, there are many publications in this subject, among them, Liker and Meier are able to lay down the roadmap in a book Toyota Way Fieldbook [22] to illustrate a lean improvement cycle. The steps are:

- 1) Map your current value stream.
- 2) Stabilize your processes.
- 3) Connect your processes through pull.
- 4) Standardize your processes as a basis for continual improvement.
- 5) Reduce process demand variation within your value stream by load leveling.
- 6) Continue to strive to reduce wastes by going back to step 1.

There are more methodology of problem solving on continuous improvement, such as PDCA, TOC-5steps, etc widely adopted in many business. It is possible that many companies had some achievement with some improvement projects on these problem solving methodologies, but it is not enough to have a significant achievements without a process integrating with the methodology for problem solving for changing. Whatever the system or methodologies are used, the final successful changing requires to implement some solutions that relates to new process, new policy or new rule the effectiveness of any solution is always a function of two element:

- 1) The technical quality of the solution that can be made from any of selected appropriate problem solving methodologies.
- 2) The acceptance of the people who are the essential contributor to successful change.

The problem solving methodology such as Lean, TOC, and 6Sigma can be the first element to make the technical quality of the solution in theory. However, without a focus on involving the right people and gaining their commitment, the change will have limited success. Therefore, there is a need in the second element to have a methodology of change management emerging with problem solving methodology to gain the people's acceptance of changing quickly and efficiently. Lacking of the second element, the failure of changing might be always happened.

C. A Framework for Change Management.

Fig. 1 shows that one framework [1] helps an organization to set up a changing programme and delivering an achievement of changing. It shows that certain processes can be implemented and followed carefully during changing. In terms of the frame work, there are two key areas identified for how

an organizations successfully achieve change, which are: readiness for change, and then implementing change.

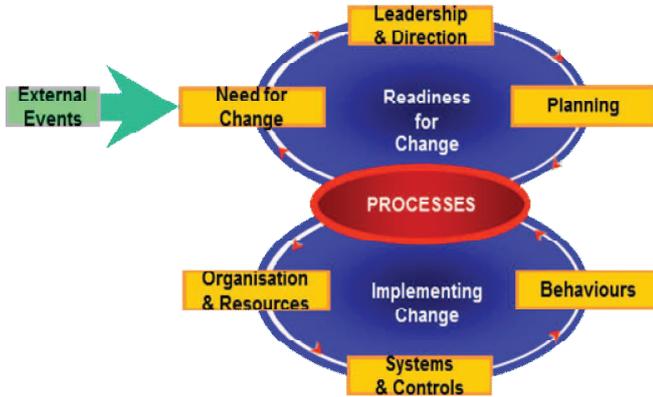


Fig. 1. The Organisational Change Framework

According to the framework, within two main areas, certain steps sequentially are identified and corresponded with a project for problem solving as below:

- Needs for change : it will focus the identified stakeholders' desire for the change.
- Leadership and direction: it will to set the expectations
- Communication planning: it will determine the focus & priorities.
- Organization & resources, along with the systems and control: it will determine the roles, structures and how we measure & control the process.
- Systems controls: it will drive the underlying beliefs & assumptions.
- Behaviors: it is very important and will reinforce the change.
- The verified improved/reengineered (TO-BE) process: it will produce outcomes that provide new triggers. When the new process is resulting in achievements in quality and on time delivery, the organization may take another trip for continuous improvement by new triggers.

III. CASE STUDY

As this study does not focus on Lean methodology for problem solving by changing process, all the relevant questions of lean can refer to Lean relevant reference, there is no more repeat here. This study focuses on how a success on changing is gained by following change management's methodology and relevant tools through the improvement project, which followed Lean 5 steps and adopted Lean methodology to improve process.

A. Background of Improvement Project for Problem Solving

This case study is about an improvement project for problem solving a company running, the project is applying Lean methodology to reduce the wastes from the cross-functional processes. The company is producing ETO (Engineer-to Oder) product that required a complicated pre-production process, including sales, commercial sales, two

level of engineering work, project management, supply chain management, product development, etc. The main motivation of improvement project is that the company has been facing a challenges of performance with a long lead-time of pre-production and poor quality of handover process between functions, large amount of time spent on rework and handover cross relevant functions. It made difficult to deliver their product to end customer on time, and keep confirmed lead time that has been agreed with customer. The defined improvement project objective is to improve the performance of pre-production by improving quality of each process and to create a lean cross-functional process.

B. A Cross-functional Project Team with Relevant Process and Changes

TABLE I.

#	Ra	Function	Responsible of business
1	R1	Sales1	Bidding process and win a project order, handover to project management
2	R2	Sales 2	Supporting R1 with commercial conditions
3	R3	Engeering1	Design 1 related
4	R4	Engeering2	Design 2 related
5	R5	Project Management	Project management starting handover from R1 until project is finished
6	R6	Supply Chain Management	Sourcing, purchasing
7	R7	Operation	Planning, production
8	R8	Product development (PD)	Technical support, BOM (Bill of Materials) issues on engineering design

^a. Stakeholders (R)

The process issue in case company needed to be solved by project, and they are cross-functional problem, therefore, it is very important that key project member/stakeholders impacted by the issues from different functions to buy-in improvement project and their deeply involvement. The firstly, the involved stakeholders with their responsible are identified and described in TABLE I, and the process of each function is illustrated in Fig. 2.

There are eight key roles called as stakeholders involving the improvement project with a change management as they had impacted on process issues. The stakeholder 1-7 (R1-R7) is identified from beginning, the eighth (PD) is identified and joining the project later during implementing change due to the project team didn't identify, but realized later this function caused an obstacle for changing. This is one of learning part from the perspective of change manage. The details are described in next section.

Fig. 2 shows the stakeholders along value chain on order handling from customer order handover to operation in workshop. Obviously, they played important roles on change the order handling process. The company is doing ETO (Engineering to Order) product that required a complicated Engineering work, and some of key parts or components could only been purchased after Engineering. The quality of information along the value chain is very important for all

functions in order to make order handling on-time and on-quality. Besides issues on how to use Lean methodology, the big challenge is to gain the involved people's acceptance quickly and efficiently. Therefore, in order to make a successful change management, the project team used the change framework shown in Fig. 1 with its process integrated to overall project management.

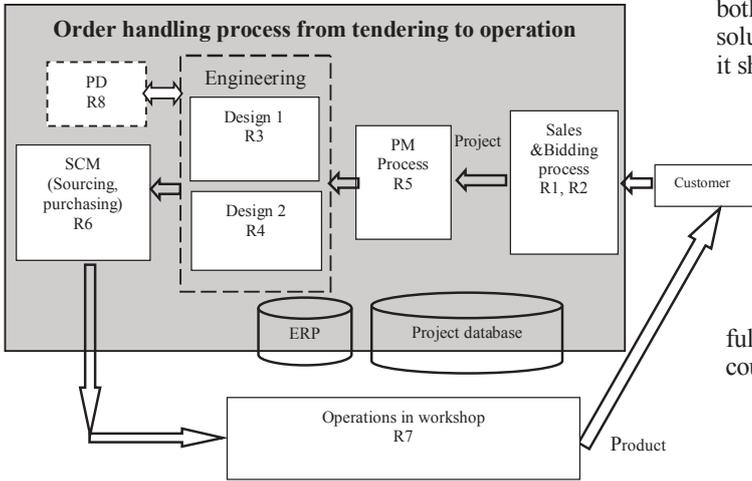


Fig. 2. Stakeholders corresponding with process and changes

C. Change Management Framework Integrated within Continuous Improvement Methodology

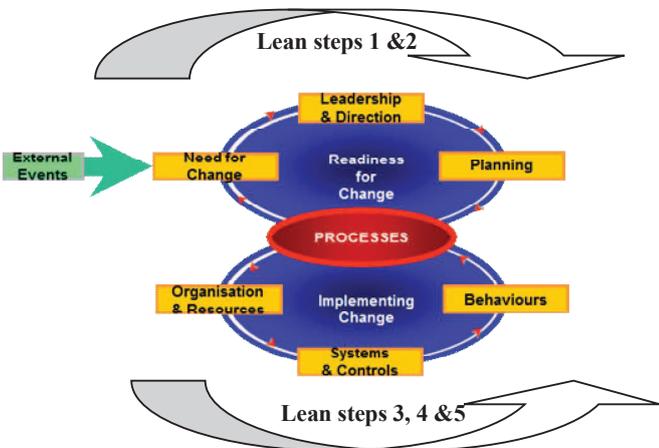


Fig. 3. Change management framework integrated within Lean steps of improvement project

The improvement project is using Lean methodology, in details, it is lean improvement cycle with 5 steps in practice. In order to have a successful change gained by improvement project, the framework for change management is integrated within the lean improvement cycle, shown in Fig. 3. It illustrates that lean improvement cycle, with Lean steps needed to synchronize with focused steps of change management, with two main areas of framework. The necessary key activities during project are made linking with change management process, which summarizes in details as TABLE II. TABLE II

summaries that how relevant activity is defined and made according to key steps for successful change integrated with lean improvement cycle.

IV. FINAL RESULTS AND DISCUSSION ACCORDING TO CHANGE MANAGEMENT

As stated early, success of changing is always a function of both elements, which involves the technical quality of the solution and the acceptance of the people, from the case study, it shows that:

- Lean methodology with relevant tools to the technical quality of the solution in case study.
- Change management methodology with relevant tools to the widely acceptance of the people. Appropriate change management theory, methodology, and relevant tools could be integrated with project management in terms of different stages during project.

The project has taken 18 months in total from kickoff until full implementation of major defined solutions, the results could show two types' benefits from changing as below:

- Tangible benefits: could have clear, measurable impacts shown by project KPI (Key Performance Indicator).
- Intangible benefits: could be difficult to quantify, but could be substantial of changing. For instance: people's behavior, better collaboration, customer and associate satisfaction of changing.

Regarding the tangible benefit as above, the tangible KPI targets reached when the project closed. Some major of KPI are as below:

- Grade of quality project handover to from sales to Project Management: average ratio of each category increased 50%.
- Grade of customer satisfaction on project database from survey: from 3.0 increased to 4.5 at end of project.
- Cost savings from engineering hour's reduction: 78.0 KLC/year (KLC: Kilo of local currency).
- Cost savings from Project management hour's reduction: 42.0 KLC /year.
- Numbers of clarification of handover reduction: 64% per quarter.

Regarding the intangible benefits, it must be associated with tangible benefit even it is not easy to be quantified. All above benefits from changing are not only from implementation of Lean methodology, but also from change management integrating with lean methodology even though there is no direct KPI for this part of benefits. Without the change management, it is unbelievable that the project could gain buy-in, and have great cooperation from all team-members to get great tangible achievement.

The case study shows following key points that might be taken into account in order to enable successful change for problem solving:

- Buy-in from organization and key stakeholders.
- Strong connection to the business targets.
- Effective project management on improvement project for problem solving.

- Defined relevant training both from perspective of problem solving methodology such as Lean, and change management methodology, such as framework for change management, and tools (Tuckman's model, TuKübler-Ross model) if needed.
- Adopting tools to support change management during implementing changes.
- Commitment and communication.
- Effective leadership.
- External consultants involvements.

V. CONCLUSIONS AND LEARNING

This paper describes the principle of change management and relevant tools. It evaluates the application of change management methodology to an improvement project for problem solving. The case study proves positive impacts of change management on success for lean project. It shows that the change management methodology enables success changing from improvement project theoretically through problem solving methodology. It also directly evaluates the performances from process changing made by lean methodology. Obviously, without change management methodology, there might be limitation of success of changing or even fall into failure of process changing in organization. Some learning from this research could be summarized as below:

- Improvement on the problem solving: Lean, TOC, and 6Sigma are only the one key element to make the technical quality of the solution theoretically. With a integration with systematic methodology of change management and relevant tools, the success of change will be enable or avoid falling into failure.
- Framework on change management: one appropriate framework is very important for successful change and needs to be integrated within the project's phase logically.
- Application of tools, models for changing in different phases: there is a need to adopt appropriate models, tools and other relevant tools linking to project phases and corresponding with problem solving methodology, these enable success and overcome the obstacles occurring on different phases.
- Quality on changing: measurable performance could be the quality of changing. With change management, it ensures good quality of change that includes all changes in processes, methodologies and people's behaviors.

Further research on change management for problem solving could be extended by:

- Expanding the relative application in more different organizations.
- Researching and defining a suitable tangible measurement specifically to success of changing management, i.e. find appropriate performance to evaluate different grade of success of changing. However, this would still be difficult and take time to make.

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TABLE II. PROJECT ACTIONS LINKING WITH CHANGE MANAGEMENT PROCESS

Frame areas	Key steps for change	Key activity accordingly	Steps of lean improvement cycle
Readiness for change	Identifying triggers for change	<ul style="list-style-type: none"> - Business assessment is done and facilitated by professional consultants, which shows potential for improvement - Initiatives for changing from complains internal and external - KPI is collected from inside and outside to show poor performance 	<ol style="list-style-type: none"> 1. Current value stream 2. Stable processes
	Establishing need for change	<ul style="list-style-type: none"> - Requirements from business targets - "As-Is" process mapping showing process issues - KPI baseline from inside and outside showing poor performance from "As-Is" process 	
	Providing clear leadership and direction	<ul style="list-style-type: none"> - Establishing a project change management team (champion, leaders, constantans, Steco)" - Project change management team needed a good "helicopter view" and always had visions of the next steps and keeps the goal in mind. - Project goal linking to business target - Define project KPI with its targets - All actions and solution defined towards to KPI targets -Project champion and leaders formed their team working together and had the right set of different skills that the project are needed - Tuckman Model used to help team to make most of the necessary activities during project falling into stuck loops 	<ol style="list-style-type: none"> 3. Connect processes through pull 4. Standardize your processes as a basis for continual improvement 5. Reduce process demand variation within your value stream by load leveling 6. Continue to strive to reduce wastes by going back to step 1
	Planning communications	<ul style="list-style-type: none"> - Gathering the stakeholder profiles - Focusing on all team members' minds on the change objectives - using a communication planning template to ensure the stakeholder's engagement - Prioritizing 	
Implementing change	Improving As-Is process	<ul style="list-style-type: none"> - Create "TO-BE" process to problem process according to root causes defined by Lean tool 	
	Understanding organisation and resource requirements	<ul style="list-style-type: none"> - the roles, structures of the improved process and the method to measure & control the process - Communicating the new process done through workshops and the necessary training sessions, including concepts on both Lean and change management frame and relevant tools - One- by -one coaching for the new process if needed - People involvement, communication and information sharing is very crucial at this stage - Elizabeth Kübler-Ross adopted to helping to understand personal reaction for changes in the different phases during project implementations 	
	Establishing the systems and control	<ul style="list-style-type: none"> - For new process, several ways defined and used to supporting change. - new procedures : detailed new ways of working to help and communicate how the new process can operate. Certain new instructions provided to the people. - KPIs: showing trend of process' variations, the follow-up action could be made to control the process during change. - New tool developed to monitor KPI timely - Good performance measurement also allows target areas for improvement to be identified and has a key role in communication 	
	Checking the behaviours are OK	<ul style="list-style-type: none"> - Kubler-Ross Change management cycle [23] identifies the the stages of stakeholders - Necessary support accordingly help stakeholder overcome upset down stages (anger, depression) to exploration and commitment stages - Low hanging fruit identified and made to motivate people - Necessary one-by-one training/coaching/supporting to key person who is really behaving as denial or resistant during change 	
	Verifying the TO-BE process	<ul style="list-style-type: none"> - Piloting TO-BE process if possible, - standardization after review piloted process and ensure improved process working OK 	