

INTEGRATION PROJECT MANAGEMENT – GESTAMP AUTOMOCION

Isaac Hernández, José
Gestamp North America

Gestamp Automoción is a benchmark international supplier for leading vehicle manufacturers such as Volkswagen, Renault-Nissan, Peugeot-Citroën, Daimler, GM, BMW, Ford, Fiat-Chrysler, among others.

Specialised in developing innovative new products and technologies, Gestamp is currently expanded on an international context in 20 countries with a clear innovation and productive commitment.

The project management philosophy is focused on the practice of knowledge, skills, procedures, and tools to work on the project in order to meet with the objectives which it was launched. Based on the Project Management Professional (PMP), globally transmitted by the Project Management Institute (PMI), Gestamp Automoción has continuously developed productive and management process, trying to adapt to exigent market and clients's demands.

After the session, you will be able to:

- Identify the basic concepts of Project Management Methodologies implemented in Gestamp and their influence in project success.
- Understand group of process of the integrated management approach (initiating, planning, executing, monitoring & controlling, closing) and their interdependences.

Finally, a business case will be exposed as a real exercise in order to fulfill the different contents of the presentation as well as possible questions and suggestions.

Keywords: integration; projects; process; automotive; suppliers

GESTIÓN INTEGRADA DE PROYECTOS – GESTAMP AUTOMOCIÓN

Gestamp Automoción, proveedor de referencia internacional de los principales fabricantes mundiales de vehículos como Volkswagen, Renault-Nissan, Peugeot-Citroën, Daimler, GM, BMW, Ford, Fiat-Chrysler, entre otros.

La dirección de proyectos se fundamenta en la práctica de conocimientos, habilidades, procedimientos y herramientas a los trabajos del proyecto con el objeto de cumplir el/los objetivos por los que fue emprendido. Basado en la metodología Project Management Professional (PMP), difundida internacionalmente por el Project Management Institute (PMI), Gestamp Automoción desarrolla evolutivamente procesos productivos y de gestión adaptándose a las continuas demandas de mercado y de cliente.

Tras la exposición, se pretende que el público receptor sea capaz de:

- Identificar los conceptos básicos de las metodologías de gestión de proyectos empleadas en Gestamp y su influencia en el cumplimiento de los proyectos.
- Comprender los grupos de procesos en la gestión integrada de proyectos (inicio, planificación, ejecución, supervisión y control y cierre) y su interdependencia.

Finalmente el desarrollo de un caso práctico, servirá de ejemplo en donde se podrá enmarcar los aspectos anteriormente citados así como de revelar posibles cuestiones surgidas al respecto.

Palabras clave: integración; proyectos, procesos; automoción;proveedor

Correspondencia: José Isaac Hernández - jisaachernandez@yahoo.es,
jihernandez@us.gestamp.com

Agradecimientos: I would like to sincerely acknowledge: Polytechnic University of Cartagena, María Socorro García-Cascales. Assistant Director of the International Doctoral School of Cartagena, (Spain); Gestamp Company, Francisco Alvarez Herrera. Corporate Learning and Development Director of Gestamp Group, Daniel Pérez Sanz. Program Manager Director of Gestamp North America.

1. INTRODUCTION

Gestamp is an international group dedicated to the development and manufacturing of metal components and structural systems for the automotive industry.

- Its vision is to be the most renowned automotive supplier for its ability to adapt automotive business to create value for the customer, while maintaining sustainable economic and social development.
- The Group specializes in developing innovatively designed products to achieve increasingly safer and lighter vehicles, thereby reducing energy consumption and environmental-impact.
- Based in Madrid, Spain, Gestamp is present in 20 countries and has 96 manufacturing plants, 12 R&D Centers and a workforce numbering over 30,000 employees worldwide.

Gestamp NAFTA

Gestamp North America is one of the five divisions that compound Gestamp Group (North Europe, South Europe, Mercosur, NAFTA and Asia).

Gestamp NAFTA Division provides to both United States and Mexico markets getting more than 30% of the total Group. Head-offices are located in *Troy Center Drive, Michigan (USA)*, 22km North of Detroit. It was founded in 2004 with around 160 employees.

All operations of the NAFTA Division are monitored from the head-office with the following expertise:

Table 1: Gestamp NAFTA Departments

Product Design	Engineering
Processing/Tooling	Program Management
Sales & Marketing	Finance & Information
Operations Technology	Purchasing

Note: Besides the Head-Office building, some manufacturing plants are distributed between US and Mexico countries.

- US: Chattanooga I & II (Tennessee), Lapeer & Mason (Michigan), Alabama (Alabama), South Carolina, West Virginia.
- México: Puebla I & II, Aguascalientes, Toluca and San Luis de Potosí.

2. OBJETIVES

- Understanding how technologies are applied (from Definition to Start of Production), as well as their influence in project success.
- Identifying process (creation, manufacturing) related to Gestamp North America.
- Giving a project management approach (cost breakdown & configuration management) as well as general overview of Product & Process validation.

3. BUSINESS CASE

a. Project Definition

i. Request for quotation (RFI/RFD/RFQ)

As part of the Gestamp methodology, client's requests are mandatory to structure the Product Creation Process. As part of the standard procedure, request are as following:

- Request for Information: As a TIER1 Supplier, Gestamp can determine which providers best match technical operations to be outsourced. It is normally applicable for new full development projects (little familiarity with its capabilities and multitude of potential bidders provided by the OEMs).
- Request for Development: Pure development project starts with a concept design request from client. Designs may or may not be owned by OEMs so consequently used by TIER1 Suppliers. Moreover a technical solution must be also added.
- Request for Quotation: Detailed pricing of development, tooling & manufacturing. Prior gate to the final series nomination, including general requirements such as:
 - Cost: Continuous improvement (LTC)
 - Quality – KPIs to measure (objectives).
 - Delivery – Scope of work (SoW).
 - Development – Simultaneous engineering.
 - Management – adequate resources to be established.

ii. Product Concept Proposal

There are four main project scenarios which are all covered by the modular structure of the Product Creation Process for all kinds of Gestamp products:

- Concept development: Pure concept development starts with a Request for Concept (RFC) or Request for Information (RFI). A request has been received by the client. A committee has started a project and assigned a project manager. Typically occurs during the OEM's concept phase. Project end is marked by customer concept release.
- Design without series development: Pure development project starts with concept development or a Request for Design (RFD) and no series RFQ are received. Project end is marked by design info package. (*Shah H. & Nowocin W. - 2015*).
- Full development project: It starts with a Request for Concept (RFC), Request for Design (RFD) or Request for Quotation (RFQ). Project end is marked by stabilized production.
- Build to print project: It starts with the series RFQ and a design handover from the client. Project end is marked by stabilized production.

iii. Process proposal

OEM provides existing design from existing Product CAD data (3D/Drawings) & Material. The aim of this second variable is to follow with the next elements:

- a) Creation of preliminary layout
- b) Process Simulation
- c) Raw material cost & timing estimation.

For all these aspect, Gestamp will consider not only the production volume but also the manufacturing location in which the project will be carried out.

iv. Quotation process (build to print/full development)

It serves to standardize the way that quotations are calculated, tracked and communicated to the customer. This enables company-wide collaboration and system support. Therefore, a product concept has been developed and proven feasible (internally or as a new request by the client) as well as a process design which is already finished. It will be compound by:

- Breakdown price:
 - Material price: Grade, coating, width, use of blank or coil, etc.
 - Forming price: part price and tooling.
 - Assembly price: part price, tooling and equipment
 - Logistic/Packaging price: forklift, warehouse, renting, labor, stillage, labels, Incoterm (EXW or DDP).

v. Plan schedule

The scope of work is decomposed in work packages by splitting the project into project deliverables into smaller parts. The aim of this process will be:

- Commitment with all project team members.
- Visualize sequence of the activities and implications.
- More detailed progress control.

vi. Quality targets

Gestamp has to deal with lack of information regarding to quality aspects. It is remarkable to deal with “risky” situations (quoting 20% out of target). Consequently Gestamp provides a draft quality plan version based on work performance reports which also require the inclusion of resources available. Moreover Key Performance Indicators will measure how the performance is being managed.

Key Performance Indicators to be used for monitoring are:

- Cost: EBITDA, Tooling profit & losses, IRR, CAPEX
- Quality: % of features within tolerance, % signed off PSW, product test results
- Delivery: % shipped dies, % of buyoffs, and % of part deliveries completed.

vii. Nomination letter

A quotation has been drafted and released by a committee. A letter of nomination has been received. The business case is defined based upon supplier information on purchase parts and an updated quality concept. The process design is developed and a manufacturing scenario has been drafted or updated.

Once it is received, Gestamp PM will launch the kick-off meeting with clear starting points:

- Objectives.
- Post nomination Project Team.
- Project dashboard with KPIs.
- Status of the project.

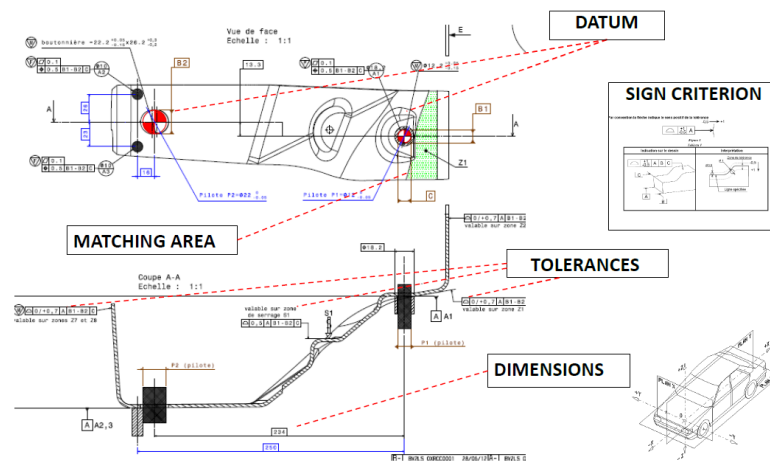
b. Technical Overview

i. Product Design GD&T

A product design has been developed tested and approved by the customer. Geometrical Dimensioning & Tolerancing (GD&T) describes nominal geometry and its allowable variation in order to manufacture a three dimensional solid. It contains the product's technical specifications. The approach of this stage is to analyze both design and manufacturing processes.

- Concept CAD for evaluation: create detailed drawings/CAD data/specifications/BOM2D Drawing and 3D model.
- Geometry: shape of the object represented as views from different angles.
- Dimensions: size of the object.
- Tolerances: allowable variations for each dimension (radius, maximum burr, trimming line, surface)
- Material: grade, coating rack, thickness and finishing.
- Datum, marking area, oil quantity, matching area.

Figure 1: Gestamp GD&T Sheet



ii. Process Design and Development

This stage is focused on the designing a process to meet OEM's requirement in terms of Quality-Cost-Delivery (QCD). A manufacturing concept for the plant is drafted (complete floor plan for *Greenfield* plants).

- Process FMEA: Similar as Design FMEA but focused on Process Failure modes. Serves to standardize the creation and documentation of P-FMEA in a way that allows exchange of results and consistent documentation towards the customer.

Gestamp Detail Process (GDP) is structured as follows:

- Detail Stamping process based on serial press.
- Logistics and packaging detailed.
- Emergency plan: alternative facilities, emergency suppliers.
- Floor plan layout: facilities and product-flow.
- Flow chart: describing schematically production steps, total process.
- Control plan: Provides a structured approach to prevent variation and to manufacture goods according to customer requirements. Moreover control plan is aligned with FMEA (product/process), process flow, significant characteristics.
- Tooling procurement: Selection of suppliers, creation of RFQ, negotiation, award CAD freeze for Tooling Manufacturing Release. Regarding to the toolmaker, it is a key activity for the project timing and cost.

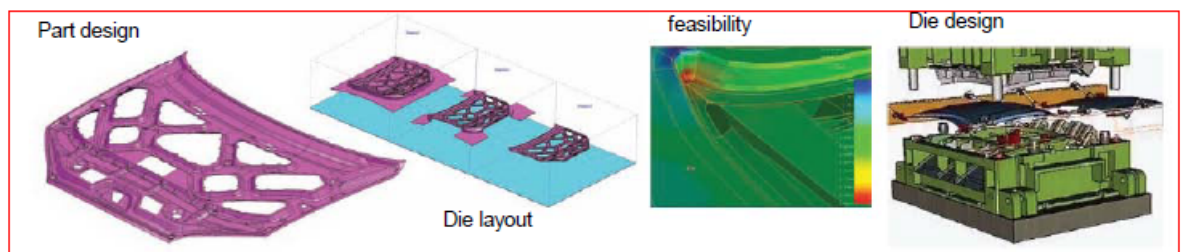
c. Die Manufacturing

Tooling Management: Serves to unify the approach for tool commissioning, tracking, buy-off and validation. This gives the company the possibility to share resources, lessons learned and valuable knowledge documentation.

- Stamping dies: High cost and long lead investment equipment. Ideally quick manufacturing, few setups are needed and full production is guaranteed. However, product changes, synchronizing with OEM's milestones, programmed deliveries, progressive quality objectives, turn its cycle time longer than expected.

Consequently, *simultaneous engineering* is vital to obtain the best combination of product – process with in-built quality.

Figure 2: Simultaneous engineering stages - Gestamp



i. Product Equipment Realization

There are four steps that *Gestamp Engineering Dpt.* must follow in order to define the Manufacturing plan.

- Process layout approval: considering costs and quality as well as OEM participation.
- Design
 - Detail design for all the parts of the die, 3D model.
 - Dimensions of die (bolster, die height, clamping area).
 - Standard element choice.
- Pattern design: 3D models for casting, Styrofoam, (CNC programming + work instructions).
- Procurement: Standards, steels.
- Casting: Die structure and components.
- Machining 2D/3D: Simple shapes and compound curves.
 - 3D frozen.
 - Check OEM authorization before integrating design change.
 - Heat treatment for new machining.
- Assembly: castings + components (springs, cams, punches).
 - Adjusting and try-out, first off tool parts: blue ink, contact points, correct misalignments and clearance.
 - Setup: several iterations to correct and achieve better geometrical quality.
 - Preliminary buy off at toolmaker's: die is suitable for production press and parts are usable.
 - Home line tryout and final buyoff: test manufacturing conditions.

Figure 3: Assembly try-outs & set up process - Gestamp



d. Configuration & Change Management

Changes usually take part during the lifecycle of all projects. Regarding to Gestamp North America (GNA) Program Management Department, “83% of on track projects have already changes implemented on their project lifecycle”.

Engineering changes that are correctly dealt with will create a profound customer loyalty as well as a constant opportunity to evolve the business. (Elezi F, Lindemann U, Tommelein I & Wilberg J.-2015).

Moreover, Change Management procedure is considered not only as a customer change request but also as an opportunity of improvement in terms of economical profitability, quality and time efficiency.

The Engineering Change Request (monitoring and control, documenting, defense of requests not approved in the contract) is:

1. Design change note: Description of the modification.
2. Communication of design changes to team members by Engineering Change Requests (ECR), assigning tasks to each evaluator.
3. Analysis, Feasibility assessment: tooling and simulations CAD/CAE.
4. Cost Detail: “rule of three” vs accurate costing.
5. Timing: toolmaker availability and client needs.
6. Technical explanation: sketches, diagrams, photos, etc.
7. Client Approval (CCB): cost, schedule and technical specifications.
8. Update drawings, 3D, documentation and diffuse.
9. Purchase Order (OEM/Toolmaker)
10. Launch and monitoring of modification as well as synchronizing with deliveries.

Figure 4: Engineering Change Request sample - Gestamp

EC#: G0XFAC-GNA-0042

Edit ECR Evaluation

Functional Area: Assembly Engineering No Impact

Submitted On: 4/14/2016

Due Date: 4/8/2016

Piece Price Impact: Select *

Tool Buyoff Impact: Select *

Cost Impact: *

Currency: USD

Feasible: Select *

Obsolescence: Select *

Bank Build Required: Select *

Timing (Weeks):

Quote Expiration:

Comments:

Add Attachment

File Name	Date
-----------	------

Submit to Program Management

Save Cancel

e. Product & Process Validation

Collection and evaluation of data, which establishes scientific evidence that a process is capable of consistently delivering quality products, respecting specifications and at the agreed rate of production. OEM final stage is called: "Production Part Approval Process" (PPAP).

The completion criteria to be completed is based on:

- Preparation of gate release presentation and decision bases for Top Mgmt. finished
- Feedback session held
- Lessons learned documented and distributed
- Update of business case done
- Update of Open issues list

Once it has been fulfilled, the PPAP sheet needs to be completed in order to end up with the project closure.

Figure 5: PPAP Status Sample Inspection – Gestamp

Initial sample inspection (PPAP) status

Name of indicator	Initial sample inspection (PPAP) status	
Description	This KPI tracks the compliance of the initial sample (PPAP) built and its results compared to the original plan and the product requirements. Status is defined according to sample results (accepted / accepted with constraints / not accepted) → PPAP-Status	
Calculation and unit	$(A/B) \times 100$	Percentage [%]
Definition	A = Number of initials sample's inspection results accepted (accepted / accepted with constraints)	
	B = Total of initial sample's inspection results	
Status for traffic light	Red:	< 90%
	Yellow:	$90\% \leq x < 100\%$
	Green:	= 100%
Critical value/ Target	100 %	
Representation	KPI represents the ratio of initial samples complying to the original plan and the product requirements	
Data source	Sample inspection results	
Update frequency	At each sample build	
Responsible	Data retrieval: Quality Accountable	
	Report: Quality Accountable	
Target report	Project Status Report	
Remark	Initial sample inspections need to be clearly defined per product before implementation	

4. CONCLUSIONS

Based on the experienced acquired during the last years, Gestamp has created profound customer loyalty as well as a constant opportunity to evolve its business. Regarding to the points treated on this report, the conclusions showed are the following ones:

Request for Quotation

- Non-completed quotations are difficult to correct, because they are base for project development and get the consequent final nomination.
- If technical specifications are not frozen during the quoting stage, it will be opportune to correct after nomination.

Geometrical Dimensioning & Tolerancing (GD&T)

- Understanding specifications is vital for cost and quality achievement.
- Technical specifications are “universal” and they are the “technical contract” between OEM – Tier1 supplier & Tier1 supplier – toolmaker.

Product Design & Development

- Prototype Design/process must be close in terms of technical level to serial design /process.
- Include correction loop in schedule to prevent timing overrun.
- Engineering Change Management must be activated since PD&D stage in order to communicate design changes.
- Simultaneous engineering is vital to obtain the best combination of product – process with in-built quality.

Process Design & Development

- Simultaneous engineering between OEM - Tier1 Supplier – Toolmaker is a key aspect.
- Keeping client involved in process design will improve performance and quality project parameters.
- Extra care for CAD data release for tool manufacturing (casting / machining).

Die Manufacturing & Product Equipment Realization

- Timing is vital for the correct execution of the project, so taking buffers for milestones does not mean to double the schedule toolmaker / OEM.
- Frequent follow up need for monitoring and performance tracking.
- Purchase: production site/plant personnel must be involved during the Buy –off process for the storage of parts, raw material, equipment, etc.
- Although delivery delays, poor quality, extra costs are all relevant risky damages, quality aspects are difficult to forget for OEM.

Configuration and Change Management

- Change means opportunities not only for technical improvements but also reduction on costs and process efficiency to mend what is wrong in product / process.
- To limit losses or increase benefits on new opportunities and sales volume.
- Communication between OEM-Tier1-supplier teams must be cohesion and prepared for changes and implements on track.
- Change Control Board decide which is the priority in terms of Time-Cost-Quality issues.

Product & Process Validation

- Progressive qualification means that making paperwork for pleasing the customer is not enough, they must be updated and really executed for your product / process.
- Do not “*sweep dirt under the rug*”. Proactive solve-problem attitude must be consistent during the project lifecycle.

From a personal perspective, having managed a study like this has showed me important add values to be applied during my professional daily life:

- Continuous learning with new technology trends, such as hot stamping, composite for automotive industry, etc.
- Receiving recognition due to a multifaceted and demanding tasks being able to work with all sorts of professional profiles.
- Exploring how company works, working directly with both customers and suppliers. It shows the path that the company is expecting you to follow.
- Challenging due to professional forthcoming projects as well as personal growth.

5. BIBLIOGRAPHY:

Magazine articles

- Elezi F, Lindemann U, Tommelein I & Wilberg J (2015). *Using a systematic perspective to support engineering change management*. *Procedia Computer Science* 61, 287-292.

Book chapter

- Shah H. & Nowocin W. (2015). *A Guide to the Engineering Management Body of Knowledge (4th edition)* (169-172pg), (213-216pg). Huntsville (USA): The American Society for Engineering Management.
- Project Management Institute (2013). *A Guide to the Project Management Body of Knowledge (5th edition)*. Pennsylvania (USA): Project Management Institute, Inc.

International Standards

- International Automotive Task Force (IATF), International Standard Organization (ISO) (2013). ISO/TS 16949:2009.

Newspaper articles

- Richards N (2016, Marzo 10). GM recognizes suppliers for delivering world class Innovation & Quality. General Motors. <http://media.gm.com/media/us/en/gm/news.html>

Youtube

- Gestamp (2014, 19 Dec). Gestamp Chassis Innovation Center. Video published in: <https://www.youtube.com/watch?v=1OBnaN6v8MA>